

A satellite map of the island of Guam, showing its coastline, urban areas, and military installations. The map is oriented vertically, with the northern tip at the top. The island is surrounded by deep blue ocean water.

GUAM DoD MASTER PLAN

(PART 1B: GOVERNMENT OF GUAM
GAP ANALYSIS & EXECUTION PLAN)

9 October 2024

FINAL



NAVFAC
Naval Facilities Engineering Systems Command
NAVFAC Pacific

Source: Cover Photo: Google Earth
Source: Inside Photo: Commander, Task Force 75



PREPARED FOR:



Department of the Navy
NAVFAC Pacific

PREPARED BY:



733 Bishop Street, Suite 2590
Honolulu, HI 96813

AECOM

999 Town and Country Road
Orange, CA 92868

FINAL | 9 October 2024

Contract Number: N62742-21-D-0200

TABLE OF CONTENTS

EXECUTIVE SUMMARY

CHAPTER 1 INTRODUCTION

1.1 Stakeholders.....	1-1
-----------------------	-----

CHAPTER 2 METHODOLOGY

2.1 Document Review.....	2-1
2.2 Interviews.....	2-2
2.3 Gap Identification and Categorization	2-2
2.4 Gap Strategy and Impact Assessment.....	2-2

CHAPTER 3 GAPS IDENTIFIED

3.1 DoD Population Growth Projection.....	3-1
3.2 Utilities	3-2
3.2.1 Electric Utilities.....	3-2
3.2.2 Water Utilities.....	3-3
3.2.3 Wastewater Utilities	3-5
3.3 Road Infrastructure	3-6
3.4 Stormwater Management.....	3-7
3.5 Port Authority of Guam.....	3-8
3.5.1 Gantry Cranes	3-8
3.5.2 Gulf Pier	3-9
3.6 Department of Labor	3-9
3.7 Guam International Airport Authority	3-10
3.8 Guam Memorial Hospital	3-12
3.9 Request for Information	3-13
4.1 Strategy/Program Need and Impact if not Addressed.....	4-1

CHAPTER 4 EXECUTION SUMMARY

4.2 Anticipated Timeline.....	4-6
4.3 Knowledge Gap Update	4-6

APPENDIX A ACRONYMS

APPENDIX B MEETING MINUTES

LIST OF FIGURES

CHAPTER 2 METHODOLOGY

Figure 2.1 Interview Schedule.....2-3

LIST OF TABLES

EXECUTIVE SUMMARY

Table ES.1 Gap Strategy and Impact Plan ES-2

CHAPTER 1 INTRODUCTION

Table 1.1 GovGuam Stakeholders 1-2

CHAPTER 3 GAPS IDENTIFIED

Table 3.1 Request for Information.....3-13

CHAPTER 4 EXECUTION SUMMARY

Table 4.1 Gap Strategy and Impact Plan4-2

Table 4.2 Knowledge Gaps Resolved.....4-6

Table 4.3 GovGuam-Furnished Documents List – Site Visit 7/20244-6

APPENDIX A ACRONYMS

A1.1 Acronym List A-1

EXECUTIVE SUMMARY



Historically, master planning efforts for United States (U.S.) Department of Defense (DoD) installations on the island of Guam have focused on lands within the installation boundaries and have not comprehensively included civilian areas of the island. The need for joint DoD and Government of Guam (GovGuam) planning for civilian lands represents an overarching “gap” in information and knowledge regarding island-wide DoD master planning. Additionally, GovGuam should be informed of DoD population growth projections and of long-term DoD planning efforts on Guam to adequately prepare for and support these efforts. Recognizing these gaps, the DoD aims to develop a comprehensive Master Plan for the island of Guam, which will encompass civilian lands, infrastructure, and assets alongside DoD installations and DoD-owned properties and infrastructure. Note that all planning involving civilian-owned assets will be accomplished in coordination with GovGuam as appropriate.

In preparation for the Guam DoD Master Plan (Master Plan), this Gap Analysis and Execution Plan for GovGuam summarizes all known plans, studies, and data on GovGuam assets and initiatives. It also identifies ongoing planning efforts with findings yet to be determined and

highlights gaps in knowledge. Critical gaps identified will be addressed as part of the future master planning process to facilitate the construction of DoD facilities and enable mission readiness. This Gap Analysis and Execution Plan outlines actions to address these gaps.

Gaps described in the following sections are based on input from GovGuam stakeholders gathered during site interviews and from review of existing documentation. [Table ES.1](#) provides an overview of the gaps identified, the type of gaps, the strategy/program need to address each gap, the impact ratings, and the impact if not addressed. Gap types include knowledge gaps, capability gaps, and data gaps. The action required to address the gap is the strategy/program need. The impact rating is color coded based on severity. Gaps with a gold rating indicate minimal impacts on the DoD’s ability to complete their mission. Gaps with orange and red ratings indicate significant and severe impacts to the DoD’s ability to complete their mission, respectively. A gray rating indicates an unknown impact. The impact if not addressed indicates how the gap could affect the population of Guam and the DoD. Projects and actions to address these gaps need to be sequenced prior to the anticipated military buildup.

Table ES.1 Gap Strategy and Impact Plan

Impact Rating on the DoD'S Ability to Complete Their Mission:



Gap	Type of Gap	Strategy/Program Need	Impact Rating	Impact if not Addressed
DoD Population Growth Projections				
GovGuam has a lack of familiarity with DoD population growth projections	Knowledge	Communicate the future DoD population growth projections and timelines of arriving forces to GovGuam agencies		GovGuam agencies' plans and projects may not be responsive to DoD population growth, resulting in potential service-level gaps
Utilities				
Continued reliance on external fuel creates risk of disruption	Capability	Transition to a more electrified grid		Continued risk to power supply due to external economic conditions, and delivery failures caused by natural and other events
Guam Power Authority (GPA) does not have the ability to monitor Navy distribution systems due to DoD security restrictions	Capability	Integrate GPA and Navy electrical systems		Future service to DoD installations and sites may be negatively impacted due to capability and capacity gaps between systems
Overhead distribution lines create risk of disruption	Capability	Install underground electrical distribution lines to increase resilience		Overhead distribution lines will continue to have higher vulnerability to weather events and tampering, leading to higher potential for outages
Lack of systems to monitor, analyze, and control energy consumption in DoD facilities	Capability	Implement Supervisory Control and Data Acquisition (SCADA) system		Potential for supply infrastructure to be inadequate to meet the demands of new facilities
Lack of verified data on DoD housing tenant energy requirements	Data	Validate DoD housing tenant energy requirements		Potential for gaps in power supply in meeting DoD housing area demands
Lack of redundancy in water utilities	Capability	Provide more interconnections between Guam Waterworks Authority (GWA) and DoD water utilities		Increased risk of service interruptions due to infrastructure failures, weather events, or other threats
Lack of reliable power generation for the water wells	Capability	Develop and implement a plan to enhance power availability for water wells		Increased risk of water supply interruptions to some areas and reduced resiliency

Table ES.1 Gap Strategy and Impact Plan (Continued)

Gap	Type of Gap	Strategy/Program Need	Impact Rating	Impact if not Addressed
Overall shortage of water storage capacity	Capability	Develop and implement a plan to address water storage capacity issues		Increased risk of water scarcity and especially during drought conditions
Lack of designated fire water supply source	Capability	Develop and implement a plan to increase fire water storage		Potential for inadequate fire fighting capabilities in some areas
Capacity to meet fire flow requirements unknown	Data	Conduct a study to determine if the distribution system meets fire flow requirements		
Per- and polyfluoroalkyl substances (PFAS) in water system	Capability	Treat PFAS contamination		Consumption of contaminated drinking water poses an increased risk of reproductive, developmental, immune system, hormonal, and other health issues including cancer
Condition of wet wells unknown	Data	Conduct a wet well study		
Capacity of the potable water distribution system unknown	Data	Conduct a study to determine the capacity of the potable water distribution system		
Wastewater collection system capacity inadequate for current conditions	Capability	Conduct a study to identify strategies to increase wastewater collection system capacity		High potential for system failure, resulting in backups and health hazards
Wastewater collection system capacity unknown	Data	Conduct a study wastewater collection system study		
Impacts from metals released from the combined outfall not fully analyzed	Data	Conduct a study to assess impacts of metals in water from the combined outfall		

Table ES.1 Gap Strategy and Impact Plan (Continued)

Gap	Type of Gap	Strategy/Program Need	Impact Rating	Impact if not Addressed
Road Infrastructure				
Lack of alternative routes in road network	Capability	Develop alternative routes to accommodate closures, flooding, and other hazards		Major road closures may significantly reduce vehicular mobility, impacting DoD missions
Lack of road network resiliency	Capability	Strengthen, expand, and improve road infrastructure to withstand the impacts of climate change and rising sea levels		Road closures due to damage may significantly reduce vehicular mobility, impacting DoD missions
Stormwater Management				
Undersized stormwater culverts	Capability	Expand the size and capacity of existing culverts to mitigate flooding		Potential for flooding will remain high in some areas, potentially impacting DoD missions
Lack of sediment erosion control	Capability	Conduct erosion control studies		Potential stormwater infrastructure failures
Port Authority of Guam				
Inability to replace gantry cranes	Capability	Replace the three damaged gantry cranes		Increased incidence of failures and need for repairs over time as cranes age and deteriorate, resulting in reduction in port capabilities
Funding source for gantry crane replacements	Capability	Provide funding and plan for replacement of cranes is needed		Increased risk to port capabilities over time as cranes age and deteriorate
Disrepair of Gulf Pier	Capability	Repair the Gulf Pier after damages sustained from Typhoon Mawar		Continued loss of ship berthing capacity

Table ES.1 Gap Strategy and Impact Plan (Continued)

Gap	Type of Gap	Strategy/Program Need	Impact Rating	Impact if not Addressed
Department of Labor				
Uncertain status of Guam's H-2B visa exemption renewal	Knowledge	Department of Labor (DOL) to confirm renewal of Guam's exemption from two H-2B visa requirements		Impacts to Guam's ability to issue visas to temporary construction workforce
Inadequate workforce housing available	Capability	Estimate the deficit and identify strategies to create new housing		Continued impacts to housing inventory for Guam residents, and increases in rental costs
Unknown private construction projections	Data	Meet with private construction companies to understand their project projections		
Guam International Airport Authority				
Guam International Airport capabilities	Capability	Address staff shortages		Potential impacts to airport operations and expansion capability
Guam Memorial Hospital				
Insufficient capacity to meet current medical care demands	Capability	Address space requirements for hospital beds		Continued impacts to the hospital's capacity and ability to provide adequate healthcare
Shortage of staff and supplies	Capability	Address staffing and supply shortages		Continued impacts to the hospital's capacity and ability to provide adequate healthcare
Outdated information technology (IT) and utility infrastructure at Guam Memorial Hospital	Capability	Address IT and utility infrastructure improvements needed at Guam Memorial Hospital		Potential losses in efficiency, quality, and reliability of healthcare services

THIS PAGE LEFT INTENTIONALLY BLANK

CHAPTER 1

INTRODUCTION



The critical DoD assets on the island of Guam are dependent upon supporting infrastructure networks owned and operated by civilian utility authorities or the GovGuam. This Gap Analysis and Execution Plan examines the ability of island-wide GovGuam-owned infrastructure and service entities to support the island population in addition to the DoD installations. This assessment analyzes infrastructure capabilities and capacities to determine how well current and planned capacities align with increased demands from mission growth and identify gaps.

A gap is defined as any shortfall in the capabilities or knowledge of supporting systems that could negatively affect mission execution and quality of life on the island. This Gap Analysis and Execution Plan highlights the gaps that remain after the implementation of planned projects and proposes strategies to eliminate or significantly reduce deficits in GovGuam's capacity or service.

1.1 STAKEHOLDERS

Multiple agency stakeholders on Guam were identified to participate in the Gap Analysis and Execution Plan. Information was provided to the planning team by stakeholders over the course of a five-day interview site visit. Coordination and logistics for interviews were managed by the GovGuam Community Defense Liaison Office. See [Table 1.1 GovGuam Stakeholders](#) for the list of stakeholders interviewed during the week of 8 July 2024.



One Guam Stakeholders

Source: AECOM

Table 1.1 GovGuam Stakeholders

ORGANIZATION
Broadband Infrastructure Office
Bureau of Statistics and Plans (BSP)
Community Defense Liaison Office (CDLO)
Consolidated Commission on Utilities (CCU)
Department of Labor (DOL)
Department of Public Health and Social Services (DPHSS)
Department of Public Works (DPW)
Guam Environmental Protection Agency (GEPA)
Guam Fire Department (GFD)
Guam Housing and Urban Renewal Authority (GHURA)
Guam International Airport Authority (GIAA)
Guam Memorial Hospital Authority (GMHA)
Guam Power Authority (GPA)
Guam Solid Waste Authority (GSWA)
Guam Waterworks Authority (GWA)
One Guam Power and Water (Naval Facilities Engineering System Command [NAVFAC] Marianas)
Port Authority of Guam (PAG)



The Port of Guam Container Terminal

Source: [DIVIDS.com](https://divids.com/)/Sara Muir

CHAPTER 2

METHODOLOGY



2.1 DOCUMENT REVIEW

A review of existing documents was completed and submitted in the Guam DoD Master Plan Part 1: Gap Analysis & Execution Plan document. The document review informed the development of the questionnaires for the interviews. The list of documents reviewed includes:

- 2030 Guam Transportation Plan (Final, 17 December 2008)
- Guam Broadband Infrastructure 5-Year Action Plan, Internet for All (Final, August 2023)
- Guam Department of Education School Facility Master Plan (Final, May 2022)
- Guam Power Authority 2022 Integrated Resource Plan
- Guam Supply Chain Baseline (Final, September 2023)
- Guam Waterworks Authority Water Resources Master Plan (Final, October 2026)
- Medical Facility Maintenance Root Cause Analysis Site Report - Guam Memorial Hospital (Final, August 2023)
- Port of Guam (Apra Harbor) Seaport Assessment, Transportation Infrastructure Capability Assessment (Final, June 2023)
- The Territory of Guam Comprehensive Emergency Management Plan (Final, December 2016)

2.2 INTERVIEWS

The planning team conducted interviews with GovGuam and other public service agency stakeholders. Questionnaires were sent to stakeholders prior to the interviews. Questions included:

- What is the purpose/mission of [your agency] on Guam?
- What are your capabilities (duties, services, etc.)?
- What areas of the island do you service?
- How is [your agency] organized?
- Are there enough staff to perform services?
- Do other agencies support initiatives of [your agency]?
- Can you share your most recent list of current and future projects?
- Are there currently any service shortfalls identified by [your agency]?
- Are there any proposed studies/projects to address these shortfalls?
- How is [your agency] planning for the military expansion on Guam?
- Are there any plans to expand utility systems, water systems, trash services, etc. to prepare for the military expansion?
- Has [your agency] conducted any recent transportation [traffic, port, airport] studies?

Additional data was provided by stakeholders and reviewed by the planning team. A total of 17 stakeholder groups were interviewed, as shown in [Table 1.1](#). See [Figure 2.1](#) for the interview schedule. The interviews allowed the planning team to ask follow-up questions on the topics included in the questionnaires depending on the responses received.

2.3 GAP IDENTIFICATION AND CATEGORIZATION

Gaps identified during the interviews were recorded and assessed. Gaps identified and discussed in this document are categorized as:

- Capability gaps – a shortfall in the size, functionality, quality of service, or ability of physical systems to meet demands
- Knowledge gaps – lack of understanding/knowledge
- Data gaps – lack of sharing of information between two or more entities, or information does not exist

The gaps identified during the interviews were classified into key topics, including:

- DoD Population Growth Projections
- Utilities
- Road Infrastructure
- Stormwater Management
- Port Capabilities
- Labor and Workforce Housing
- Guam International Airport Capabilities
- Guam Memorial Hospital Capabilities

Several gaps identified in the Guam DoD Master Plan Part 1: Gap Analysis & Execution Plan document were eliminated due to new information received from GovGuam (see [4.3 Knowledge Gap Update](#)).

2.4 GAP STRATEGY AND IMPACT ASSESSMENT

Following identification of the gaps, strategies/program needs provide recommendations on the way-forward for projects, issues and concerns. Impacts if not addressed are identified along with the severity to the island and the DoD's ability to complete their mission.

Guam Master Plan - Part 1B Draft Interview Schedule					
Location: Community Defense Liaison Office, Office of the Governor of Guam					
	08-Jul-2024	09-Jul-2024	10-Jul-2024	11-Jul-2024	12-Jul-2024
	Monday	Tuesday	Wednesday	Thursday	Friday
0800-0830					
0830-0900					
0900-0930		One Guam Power 173 Aspal Ave., Suite 201 Hagatna 2nd Floor	CDLO_Labor_NAVFACPAC Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor	CDLO_Housing_NAVFACPAC Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor	CDLO_Consolidated Commission on Utilities 173 Aspal Ave., Suite 201 Hagatna 2nd Floor
0930-1000					
1000-1030					CDLO_GIAA_NAVFACPAC Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor
1030-1100		CDLO_Health_Emergency_Response_NAVFACPAC Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor			
1100-1130				CDLO_GWA_NAVFACPAC Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor	
1130-1200					
1200-1230	Break for Lunch		Break for Lunch	Break for Lunch	Break for Lunch
1230-1300					
1300-1330	Executive Director Community Defense Liaison Office	CDLO_Port Authority_NAVFACPAC Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor	CDLO_BB Infrastructure_NAVFACPAC Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor	Outbrief	
1330-1400					
1400-1430					
1430-1500	NAVFACPAC GPA Site Visit / CDLO_GWA_NAVFACPAC Masterplan	(2:45) CDLO_DPW_NAVFACPAC Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor	CDLO_GEPA DoD Masterplan 173 Aspal Ave., Suite 201 Hagatna 2nd Floor		
1500-1530					
1530-1600					
1600-1630					

Figure 2.1 Interview Schedule

THIS PAGE LEFT INTENTIONALLY BLANK

CHAPTER 3

GAPS IDENTIFIED



Gaps are described in the following sections based on review of existing documentation and input from GovGuam stakeholders during site interviews.

3.1 DOD POPULATION GROWTH PROJECTION

A common theme across the GovGuam interviews was the need for a clearer understanding of the projected DoD population growth on Guam and the phased timeline of the buildup. GovGuam agencies recognize the importance of preparing for this growth and are committed to ensuring that infrastructure and utilities are sufficient or that appropriate measures are taken to adequately prepare Guam for the expansion.

DOD POPULATION GROWTH PROJECTION GAP

GovGuam agencies recognize the importance of preparing for this growth and are committed to ensuring that infrastructure and utilities are sufficient or that appropriate measures are taken to adequately prepare Guam for the expansion.

3.2 UTILITIES

Electric power, water, and wastewater utilities all have gaps in capacity and reliability on Guam as identified by GovGuam stakeholders. Utility studies are necessary to further determine capacity, redundancy, and reliability needs for the DoD.

3.2.1 ELECTRIC UTILITIES

EXISTING CONDITIONS

GPA manages approximately 1,860 miles of combined transmission and distribution lines and 29 power substations within its grid infrastructure. GPA is responsible for the operations of the Island-Wide Power System that services Navy-owned and GPA-owned generation sources. However, power distribution systems within the boundaries of DoD installations are owned and operated by respective DoD entities. The largest customers in GPA's territory include the U.S. Navy, GWA, Department of Education, and GIAA, which operates the island's public airport.



The Generator Provides Power To A Food Distribution Site After Typhoon Mawar, Installed by U.S. Army Corps of Engineer Contractors

Source: DVIDS.com/Robert DeDeaux

Over 60 percent of the transmission lines are underground in areas with significant commercial and high-density residential uses. Remaining lines are overhead on either concrete or steel power poles. Presently, about 80 percent of power production is from oil-fired units that rely on diesel and ultra-low sulfur diesel provided from off-island sources. The remaining 20 percent of generation capacity is sourced from on-island renewable systems.

As of fiscal year (FY) 2024, GPA has approximately 350 megawatts (MW) of primary electrical energy generation capacity, including 85 MW of renewable energy generation, and 60 MW of battery energy storage system (BESS) shifting capabilities. GPA has a total of nearly 500 MW of energy storage capacity to support the existing peak demand.

The current peak demand on GPA's electrical grid is 257 MW, with an estimated additional 100-MW growth from DoD planned projects, totaling a future demand of approximately 360 MW (excluding future housing needs) by 2045.

By FY 2028, GPA will have expanded capacity to approximately 1.2 gigawatts (1,200 MW) of generation and storage capacity, by bringing online the Ukudu Power Plant, Tenjo Annex Diesel Units, and additional peaking diesel units, and implementing Phases II and IV of GPA's Renewable Portfolio Standards Plan.

GAPS

Capability gaps for electric utilities include reliance on external fuel imports, lack of full integration of the electric distribution systems between GPA and Navy, continued use of overhead distribution lines, and lack of a centralized SCADA system between GPA and DoD. Lack of verified data on DoD housing tenant energy requirements is a data gap for electric utilities.

Guam will continue to rely on external fuel imports. External fuel imports are vulnerable to physical, political, and cybersecurity threats as well as market conditions, which can result in supply uncertainty, price volatility, and high energy costs. Reducing external fuel reliance and transitioning to a more electrified grid requires

extensive infrastructure upgrades, especially with the impacts of growing contributions of customer-sited distributed energy resources on existing circuits. Funding authorization is needed for projects outlined in the One Guam Power Infrastructure Resilience Plan.

Transparency of the Navy electric distribution system is not available to GPA due to DoD security restrictions. GPA has the capability to monitor these systems should the DoD allow it, which will allow quick response to DoD's changing electrical needs and resolve power issues faster.

While some undergrounding of utilities projects is in progress, funding is needed for remaining projects to improve electrical distribution resiliency.

The DoD does not employ a SCADA system like GPA. The implementation of a centralized SCADA system that includes the DoD properties would enable the GovGuam to monitor, analyze, and control energy consumption.

GPA has requested the DoD provide the housing power requirements for new mission beddowns and to delineate between on- and off-base housing needed to validate the 100-MW growth projection for DoD planned projects.

ELECTRIC UTILITIES GAP

Reliance on external fuel imports, lack of full integration of DoD and GPA power distribution including transition to underground utilities, and lack of a centralized monitoring system run by GPA present vulnerabilities to electric utilities for the DoD and Guam. Distribution of data for housing power requirements between on- and off-base housing for DoD planned projects is necessary for the GPA to validate power supply versus DoD housing area demand.

3.2.2 WATER UTILITIES

EXISTING CONDITIONS

GWA is regulated by a public utilities commission. The consolidated commission of utilities is a five-member elected board. There are four divisions in GWA: water production, water distribution, wastewater production, and wastewater distribution. There are several different programs under each division. There are about 43,000 water customers and 1,000 wastewater customers. The northern water system is fed from groundwater, the central water system is fed from groundwater and springs, and the southern water system is fed from surface water.

GWA has 120 wells, with about 95 wells being active at any given time. The Capital Improvements Plan (CIP) for GWA identifies 10 to 12 inoperable wells that require rehabilitation. About 23 percent of the CIP is allocated for the remediation of PFAS. The potable water system does not remove PFAS in the typical treatment operations. GWA is considering three centralized treatment centers, each with at least three wells. The treatment process has not been selected and novel treatment methods may be required due to disposal costs.

Currently, the water wells produce 80 million gallons per day (mgd) maximum capacity, with current production at about 50 percent of the theoretical yield. Some inflow areas are better protected than others, as some areas are more highly permeable. Additionally, there are over 30 water wells with PFAS contamination.

GWA has island-wide water distribution systems that service civilian and selected DoD customers based on geographical location or limited ability to connect to the three major DoD systems. According to current studies, approximately 50 percent of the aquifer capacity is being used for current potable water requirements island-wide.

Water for fire suppression is supplied through the main potable water system. Providing a separate fire suppression water system will prevent stagnation in smaller potable water lines and reduce the drawdown of the aquifer for non-potable uses.

GAPS

Water capability gaps include lack of distribution resiliency due to age and pipe size, lack of reliable power generation for water wells, an overall shortage in water storage capacity, lack of a designated fire water supply source, and lack of treatment of PFAS contamination. Data gaps include inadequate capacity to meet fire flow requirements, unknown infrastructure conditions, and unknown potable water distribution storage capacity.

Redundancy in the water utility system is needed. Increasing the number of interconnections between GWA and the DoD water utilities is necessary to provide resiliency to the water distribution system to prevent interruption.

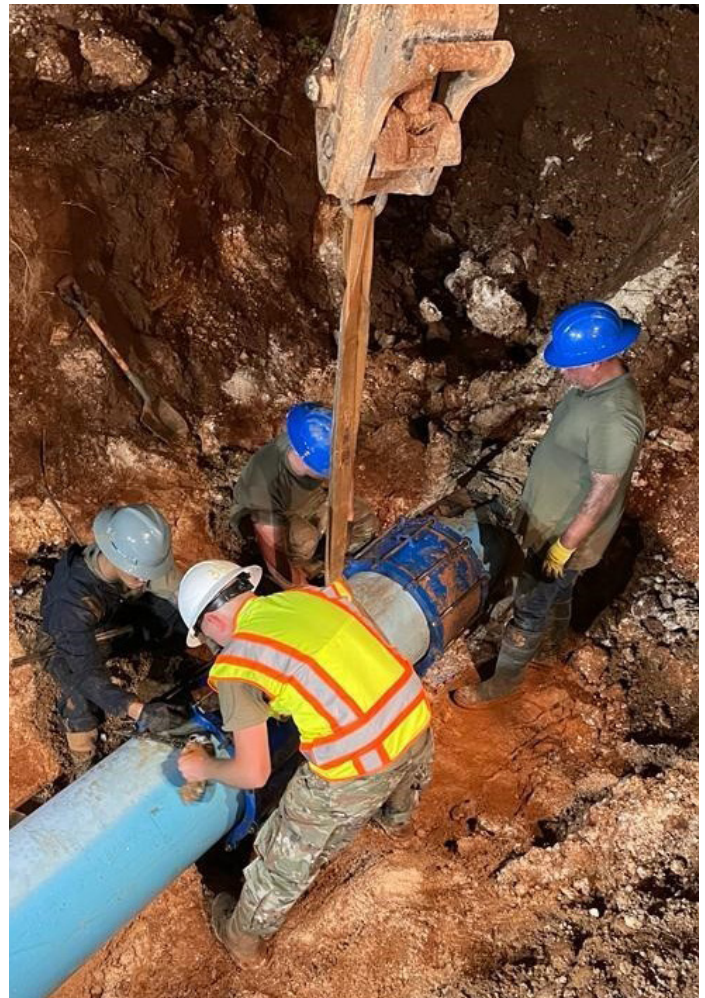
WATER UTILITIES GAP

Lack of distribution redundancy, lack of reliable power generation for water wells, an overall shortage in water storage capacity, lack of a designated fire water supply source, and lack of treatment of PFAS contamination present vulnerabilities to water supply and distribution on Guam. Unknown pipe conditions, unknown potable water distribution storage capacity, and unknown capacity to meet fire flow requirements require investigation.

There is a lack of reliable power generation and power supply to the water wells. The wells are supplied power from the electrical grid under normal conditions but have generators for backup power/redundancy. GWA recommends the wells to be fully powered through the electrical system with buried electrical power lines to reduce outages from storm events. There are currently issues with generator refueling and manual start requirements during emergency events.

There is an overall shortage of water storage capacity. Water storage tanks were recently added at Santa Rita and Santa Rosa but a deficit in water storage remains.

The ability of the distribution system to meet fire flow requirements is unknown, and a designated fire suppression water supply source is needed. There is no plan or funding source to address fire suppression water storage needs.



36th Civil Engineer Squadron Repair Damage To One Of Andersen Air Force Base's Main Water Supply Lines

Source: DVIDS.com

PFAS contamination exists in the water wells, but current water treatment does not remove the chemical. A pilot test for a treatment system was completed but the system is still in design. More work and funds are needed to bring the potable water system into regulatory compliance before the enforcement deadline for the new U.S. Environmental Protection Agency (EPA) maximum contaminant Levels. Identifying and implementing a viable treatment method is necessary to protect the population of Guam and the DoD population from exposure to contaminants in drinking water.

3.2.3 WASTEWATER UTILITIES

EXISTING CONDITIONS

For wastewater, there are seven basins and six treatment plants on Guam. The Agana Wastewater Treatment Plant (WWTP) and Northern District WWTP on Andersen Air Force Base (AAFB) process about 5 mgd of wastewater, with a design capacity around 10 mgd. The Agana WWTP's peak flow requirement is 3 mgd. The WWTPs may lack the capacity to address the population buildup. The plants were planned to accommodate previous U. S. Marine Corps buildup estimates, and do not consider recent mission changes. GWA received \$173 million (M) in grant funding from the DoD to manage water sources. GWA has upgraded the Northern District WWTP to secondary treatment, it now can receive higher volumes of wastewater from AAFB.

The southern surface water treatment plant currently processes about 2 mgd. The plant has a rated capacity for 4 mgd, although it has never processed that volume. GWA would like to expand the treatment plant to an 8 mgd rated capacity. A study is underway to evaluate maintenance and repairs and to install a raw water reservoir.

There are water meters in place outside the fences of small DoD facilities. However, the SCADA system is manual, and the water treatment plants and WWTPs rely on local control systems. GWA is working to connect individual systems.

GWA is advocating for a transition away from septic systems. Septic systems can have many problems, especially if they are not properly maintained. Septic systems can cause health and environmental concerns

as well. A septic tank elimination program is included in the 20-year and 5-year plans.

A list of projects that have been completed since the 2018 Water Resource Master Plan will be in the 2024 Water Resource Master Plan update.

GAPS

The capability gap of the wastewater utility system is that the collection system capacity is inadequate for current conditions and increased demand of DoD buildup. Additionally, there is a lack of data for the wastewater collection system capacity. The potential impact to marine life at the treated wastewater disposal site is unknown. There is a potential for release of metals from combined outfalls. PFAS concentrations within the wastewater system are unknown. The emerging concern of PFAS in wastewater discharges should be documented to note any significant treatment changes or sludge disposal modification that may be required to address PFAS.

While WWTP capacity is understood, the current capacity of the wastewater collection system is unknown. The wastewater collection capacity also is currently inadequate to serve the DoD installations. There is an understanding that PFAS may be in the wastewater system, but it has not been studied yet. PFAS contamination is an emerging concern in the industry but is not regulated yet.

At the combined outfall for the Agat plant, Santa Rita plant, and others, metals were released into the outfall. A mixing study determined these metals were not affecting marine life, but another study would be needed with the increase in DoD personnel and families.

WASTEWATER UTILITIES GAP

The current capacity for the wastewater collection system is unknown but is inadequate for current and future support of Guam and the DoD installations.

3.3 ROAD INFRASTRUCTURE

EXISTING CONDITIONS

The DPW manages the roads, supporting road expansions, road hardening, reconstruction, and other road projects.

The main arterial road, Marine Corps Drive, extends from AAFB to Naval Base Guam at Apra Harbor and experiences high traffic volume. Serving as the main vehicular commercial corridor, Marine Corps Drive provides access to shopping, businesses, government buildings, and industrial facilities, and facilitates the movement of goods and fuel from the Port of Guam to the business district and installations. There are limited alternate routes available, and the main thoroughfare is at risk of wave run-up or overtopping during large storms or typhoons. There is a lack of alternative routes for drivers, which causes choke points in the event of heavy traffic volume or an accident.

Generally, the conditions of the roads are good to fair and load-bearing capacities are adequate for large and heavy vehicles. However, several stakeholders indicated issues with the current transportation network. Some roads require widening to allow access for large fueling vehicles or have bridges with weight limitations.

Many roads currently experience traffic congestion during peak hours and would benefit from improvement projects such as widening two-lane roads into four-lane highways. The DPW suggested expanding Route 6, Route 9, and Route 17 by adding additional lanes to provide redundancy in the road network if Marine Corps Drive becomes inoperable.

Guam Regional Transit Authority is responsible for public transportation on Guam. The existing public transportation system is limited and interest in public transportation is low due to hot and humid weather conditions. The primary mode of transportation on Guam is personal vehicles.

Climate change and sea level rise pose a risk to roadway infrastructure. The University of Guam has documented a loss of approximately 15 inches of coastline over the last 30 years on Guam and predicts significant sea level rise on the southern end of the island. Climate adaption measures include road hardening or road setbacks. Additionally, inland roads, such as the roads used to transport fuel from the Port to the fuel farms, are vulnerable to wave run-up and overtopping during large storms, which could cut off access to fuel island-wide.



Ground Breaking Ceremony For The Reconstruction Of Route 5

Source: [DVIDS.com/Valerie Lynn Maigue](https://www.dvids.com/ValerieLynnMaigue)

3.4 STORMWATER MANAGEMENT

EXISTING CONDITIONS

The DPW is currently developing a Stormwater Management Plan, a requirement of Municipal Separate Storm Sewer System (MS4) permitting with the U.S. EPA. The 8-year EPA stormwater permit in place for MS4 expired 31 January 2024 and must be prepared.

The stormwater systems experience maintenance issues. For example, a low-lying area near the other end of Tumon, on the south side of Guam, accumulates stormwater, causing frequent flooding. The tides influence flooding as well. Guam experiences the most issues with flooding during flash floods and high tidal periods. Flooding is more common in southern Guam. Maintaining sediment control also is a challenge.

A stormwater model has not been developed and information on baseline conditions and water quality improvements are not determined to assist with meeting MS4 requirements.

GAPS

Stormwater management capability gaps include stormwater model, undersized stormwater culverts and a lack of sediment erosion control.

Stormwater culverts are currently undersized to mitigate flooding. Stormwater infrastructure failures cause increased erosion. Currently, Guam is not positioned for flood management and erosion control in the southern portion of Guam. Guam's EPA MS4 permit expired, and baseline loading data and modeling is not available to support the calculations needed for the MS4 permit.

STORMWATER MANAGEMENT GAP

Culverts are undersized and deteriorating and require improvements to mitigate flooding and control erosion.



Road Conditions Near AAFB

Source: Google Streetview

ROAD INFRASTRUCTURE GAP

The road network lacks redundancy necessary to maintain adequate vehicular circulation between key points in the event of a closure of a main road. Some critical roads need widening and improvements to increase capacity and resiliency.

GAPS

Transportation network capability gaps include the lack of alternative roads in the road network and lack of road network resiliency.

Road network redundancy is a critical gap in the Guam Master Plan and must be addressed prior to DoD buildup. Currently, the network lacks sufficient alternate routes to accommodate closures, flooding, and other hazards. To enhance the resilience of the transportation network, alternate/additional routes should be developed to increase road network redundancy, existing roadways should be strengthened and expanded, and road infrastructure should be bolstered to withstand the impacts of climate change and rising sea levels.

3.5 PORT AUTHORITY OF GUAM

3.5.1 GANTRY CRANES

EXISTING CONDITIONS

The Port of Guam is currently operating at 40 percent capacity. Replacement of all three gantry cranes is necessary due to damage from Typhoon Mawar, and the gantry cranes are reaching the end of their service life. PAG has been coordinating with Federal Emergency Management Agency (FEMA) for repairs. The existing gantry cranes are Japanese Hibachi cranes with a caterpillar diesel engine. Being over 40 years old, the cranes have exceeded their lifespan, but are still fully functional. The cranes must be replaced with "Buy American"-compatible equipment, which is not readily available through U.S. manufacturers. PAG has

considered using loans to purchase the cranes instead of federal funding. PAG plans to be ready for the military buildup on Guam, but funding and timeline of crane repairs or replacements are unknown. If one of the three cranes needs to be repaired and is inoperable, this could result in a 4-year delay to the DoD buildup.

If an increase in port throughput is needed, a fourth gantry crane and additional yard space would be needed. Space is available near berth F6 for a fourth gantry crane.

GAPS

Capability gaps for the gantry cranes include inability to replace the cranes and a lack of funding for replacement.



The Port Of Guam Container Terminal, The Island's Only Deepwater Port And Receives About 90 Percent Of The Island's Imports.

Source: [DIVIDS.com](https://divids.com/)/Sara Muir

The gantry cranes at the Port of Guam are over 40 years old, past useful life, and have sustained damages from Typhoon Mawar. Securing funding to purchase new cranes has been challenging; per the Buy American Act, the cranes must be American made to be eligible for federal grant funding. Funding efforts have been unsuccessful. Additionally, PAG does not have a clear understanding of the DoD population growth timeline to know when the new cranes are needed to support buildup.

3.5.2 GULF PIER

EXISTING CONDITIONS

Gulf Pier was hit by a floating crane that broke loose from the surge during Typhoon Mawar. The pier is used for fuel and cement delivery. PAG, working with FEMA and the U.S. Army Corps of Engineers (USACE), is repairing the pier.

Pier damage has slowed the offloading and delivery of cement from a four-day process to a seven- to nine-day process. Cement was previously pumped directly off the vessel into the silos. Now, cement must be offloaded onto a tanker truck from F1 pier and then pumped into the silo.

GAPS

The Gulf Pier was damaged during Typhoon Mawar, which has created a capability gap, but PAG is in active discussion with FEMA for the pier repair. Until the Gulf Pier is repaired and fully operational, cement offloading will continue to be inefficient, which could result in construction or project delays.

GULF PIER GAP

Typhoon Mawar damaged three gantry cranes and the Gulf Pier, impacting the PAG's capability to process ship cargo. This infrastructure is in need of repair and replacement.

3.6 DEPARTMENT OF LABOR

EXISTING CONDITIONS

H-2B workers can support any contract for construction, repairs, or services that are directly connected to or associated with the DoD. There are exemptions for projects that are not directly connected to or associated with the DoD but support the DoD (such as DoD housing projects), or projects that are adversely affected by the DoD (such as projects for off-base schools). Medical contracts are also exempt from the requirement to be associated with the DoD; any allied healthcare employer can bring in H-2B workers under the exemption if they service both military and local patients. The biggest healthcare need on Guam is nurses.

H-2B visas are valid for three years and can be extended. The visa applications are approved by the DOL with the U.S. Citizenship and Immigration Services. The Governor is the certified processor for these visas. The workers must return to their home countries to reprocess their visas every three years.

Guam is exempt from the 66,000-worker limit and the temporary need requirement. This exemption will expire in 2029. The DOL is actively trying to extend the same exemptions for five additional years if possible. Should the exemptions not be renewed in 2029, the number of H-2B visa workers will sharply decline.

There is currently insufficient workforce housing. Core Tech International developed an 18,000-bed workforce housing area near Two Lovers Point, on the western part of the island. The Department of Land Management approved the project's zoning, but GWA required construction of a WWTP to serve this population. The project must be approved by other agencies before construction can begin on the project.

Other traditional barracks have limited capacity. Workforce housing must be located in a light industrial-zoned area and have sewage services. Pacific Rim is building a 600-bed workforce housing facility with construction scheduled one to two years out. Nan, Inc. and Black Construction have successfully built barracks on Guam. Smaller construction companies often rent apartments for their workers if they cannot build workforce housing, which further constrains housing availability on the island.

The DOL has considered using other parcels and zoned areas for workforce housing. The use of Chamorro Land Trust Commission land has been suggested, but there is no existing infrastructure.



Family Housing at AAFB

Source: DVIDS.com/ Staff Sgt. Aubree Owens

GAPS

A knowledge gap exists regarding the status of Guam's H2-B visa exemption renewal. There is a capability gap in temporary workforce housing. Private construction projects are unknown, creating a data gap.

Guam has two types of exemptions for the H-2B visa (exempt from the cap on the number of temporary workers and exempt from the requirement to demonstrate temporary need) that will expire in 2029. The workforce will sharply decline without these exemptions renewed.

Available temporary or permanent workforce housing is inadequate for the number of construction workers. Construction workers occupy commercial housing, driving up the cost and impacting the local housing market.

The volume of future private construction is unknown; projected construction volumes for DoD and GovGuam are not clearly defined.

DEPARTMENT OF LABOR GAP

Guam's H-2B visa requirement exemptions will expire in 2029. The availability/volume of the construction workforce will decline if these exemptions are not renewed. Additionally, there is limited workforce housing which forces temporary workers to seek housing in the rental market, driving up rental cost and limiting housing for the residents of Guam.

3.7 GUAM INTERNATIONAL AIRPORT AUTHORITY

EXISTING CONDITIONS

The Antonio B. Won Pat International Airport (Guam International Airport), operated by the GIAA, is the only commercial airport on Guam. The airport's peak arrival is 5,000 passengers arriving per hour. The airport has two runways —12,000 and 10,000 feet each.

The USAF uses the airport for emergency divers when military aircraft cannot land at AAFB. The southern portion of the airport is reserved for military divers and is manned by DoD security forces. The DoD avoids using the airfield during major peak travel times (early afternoon and midnight).

Currently, GIAA transports fuel to the airport daily from the Port of Guam. GIAA is working on a joint-use underground fuel line, with the potential for a mobile trailer to mix additives to create JP8 fuel without the use of trucks. The rough order of magnitude cost estimate for a feasibility study contracted by GIAA for this project is \$14 M. The joint-use fuel line would allow for continuous filling of fuel tanks while maintaining the trucks as a backup. GIAA also indicated interest in servicing DoD assets at the airfield, which is feasible with DoD Secretary's authorization.

The proposed fuel line would deliver approximately 1 million gallons of fuel per month to the airport, which can be pumped in one day. The DoD is estimating a requirement for 20-50 million gallons per month. (This estimate was developed through discussions with Defense Logistics Agency but is not documented in an official capacity.)

GIAA has the capacity to expand services at the Guam International Airports to include additional U.S. and foreign airlines. The south ramp has capacity of 20 fighter jets and has the length and width to accommodate larger aircraft for the DoD. The passenger terminal can be expanded as needed. On the southern end, GIAA is considering adding new hangars, aprons, and other support facilities. A new cargo apron is at 60% design.

GAPS

There are currently staff shortages in ground handlers, aircraft servicing (cleaning/maintenance), regulatory inspection staff (during peak periods), food and beverage staff, foreign currency exchange staff, and other specialized services.

Staff shortages are a capability gap for the GIAA.

GUAM INTERNATIONAL AIRPORT AUTHORITY GAP

The GIAA has a staffing shortage that impacts airport operational capacity.



Guam International Airport From Above

Source: [AdobeStock.com/Michael Runkel/Danita Delimont](https://www.adobe.com/stock/photos/michael-runkel/danita-delimont)

3.8 GUAM MEMORIAL HOSPITAL

EXISTING CONDITIONS

Guam Memorial Hospital is the only public, not-for-profit hospital on Guam. Other medical facilities on Guam include small community clinics that are privately owned and separate from Guam Memorial Hospital.

Guam Memorial Hospital has a 160-bed capacity with overflow areas in the hallways. More beds are needed. There is an alternate care facility, surgery center, surgical outpatient facilities, and a dialysis clinic on the island. The hospital has one trauma room for cardiology and an intensive care unit for patients who require greater level of care. There is a neonatal care unit for birthing and related services. They have a long-term care facility and use agreements in place with Joint Region Marianas. Guam Memorial Hospital provides additional hospital inpatient services, cardiology, gastrointestinal, laboratory, and radiology outpatient services. Orthopedic surgeries must be referred out.

GMHA has a five-year Strategic Plan (2023-2027). This document details GMHA's strategic goals and public engagement strategies. Strategic goals include financial viability and engaging the healthcare workforce and community, including the military community. A detailed island-wide analysis was conducted to create the Strategic Plan for the public and private hospitals. The five-year plan quantifies all data on existing conditions and examines how to prepare the hospitals for future military expansion. The Strategic Plan addresses aging infrastructure, but GMHA would like funding to correct these deficiencies more quickly.

GMHA has expressed interest in working jointly with the military and expanding partnerships.



Federal And Local Governments, And The Department Of Defense Partnered To Provide Much Needed Electrical Work

Source: [DVIDS.com/Joanna Delfin](https://dvids.com/JoannaDelfin)

GUAM MEMORIAL HOSPITAL GAP

DoD buildup will exacerbate existing bed shortages; staffing of doctors, nurses, and specialty staff; and supplies.

GAPS

Hospital bed space requirements, shortages in staffing and supplies, and outdated IT and utility infrastructure at Guam Memorial Hospital are capability gaps. Projects to address these gaps need to be sequenced prior to the anticipated DoD buildup.

From a space perspective, there are critical gaps that would be exacerbated by the increase of military personnel plus dependents, including the number of beds.

Guam Memorial Hospital has a shortage of doctors, nurses, allied health service workers, and other staff. There are shortages of services and laboratory and pharmaceutical supplies. Guam Memorial Hospital collaborates with the Naval Hospital often and would like to see DoD support staffing issues at Guam Memorial Hospital.

A key challenge in addressing the staffing shortage is the extensive process to obtain a critical access hospital designation. The designation would allow for the forgiveness of medical loans for doctors and nurses, providing a strong incentive for relocation.

IT and utility infrastructure are outdated. Although addressed in the Strategic Plan, funding to correct these deficiencies must occur more quickly. Opportunities to fast-track funding for IT and utility infrastructure improvements should be considered for anticipated DoD buildup.

3.9 REQUEST FOR INFORMATION

Table 3.1 lists requested documents and information that will better inform current gaps and determine if additional gaps exist.

Table 3.1 Request for Information

INFORMATION REQUESTED	SOURCE	JUSTIFICATION	STATUS
List of GovGuam Projects	CDLO	To align priorities across the island	Pending
BSP Geographic Information System Data	Guam BSP	To better understand the geography of Guam in relation to GovGuam infrastructure, networks and services	Received July 2024
Guam Office of Infrastructure Policy & Development, Spending Priorities Document	The Broadband Infrastructure Office	Required to understand the Broadband Infrastructure Office's spending priorities	Pending
GIAA Agency Briefing	GIAA	Required to understand GIAA priorities	Pending
GMHA Strategic Plan and USACE Study (2019)	GMHA	Required to understand Guam Memorial Hospital's existing conditions and Strategic Plan	Received August 2024

CHAPTER 4

EXECUTION SUMMARY



4.1 STRATEGY/PROGRAM NEED AND IMPACT IF NOT ADDRESSED

Strategy/program needs are identified for each of the gaps outlined in the previous section. [Table 4.1](#) provides an overview of the gaps identified, the type of gaps, the strategy/program need to address each gap, their impact ratings, and the impact if not addressed. Gap types include knowledge gaps, capability gaps, and data gaps. The action required to address the gap is the strategy/program need. The impact rating is color coded based on severity. Gaps with a gold rating indicate minimal impacts on the DoD's ability to complete their mission. Gaps with orange and red ratings indicate significant and severe impacts to the DoD's ability to complete their mission, respectively. A gray rating indicates an unknown impact. The impact if not addressed indicates how the gap could affect the population of Guam and the DoD. Projects and actions to address these gaps need to be sequenced prior to the anticipated DoD buildup.



Naval Mobile Construction Battalion 1 Places Concrete at the NMCB 1 Fena Water Treatment Storage Building

Source: DVIDS.com/Brannon Deugan

Table 4.1 Gap Strategy and Impact Plan

Impact Rating on the DoD'S Ability to Complete Their Mission:



Gap	Type of Gap	Strategy/Program Need	Impact Rating	Impact if not Addressed
DoD Population Growth Projections				
GovGuam has a lack of familiarity with DoD population growth projections	Knowledge	Communicate the future DoD population growth projections and timelines of arriving forces to GovGuam agencies		GovGuam agencies' plans and projects may not be responsive to DoD population growth, resulting in potential service-level gaps
Utilities				
Continued reliance on external fuel creates risk of disruption	Capability	Transition to a more electrified grid		Continued risk to power supply due to external economic conditions, and delivery failures caused by natural and other events
GPA does not have the ability to monitor Navy distribution systems due to DoD security restrictions	Capability	Integrate GPA and Navy electrical systems		Future service to DoD installations and sites may be negatively impacted due to capability and capacity gaps between systems
Overhead distribution lines create risk of disruption	Capability	Install underground electrical distribution lines to increase resilience		Overhead distribution lines will continue to have higher vulnerability to weather events and tampering, leading to higher potential for outages
Lack of systems to monitor, analyze, and control energy consumption in DoD facilities	Capability	Implement SCADA system		Potential for supply infrastructure to be inadequate to meet the demands of new facilities
Lack of verified data on DoD housing tenant energy requirements	Data	Validate DoD housing tenant energy requirements		Potential for gaps in power supply in meeting DoD housing area demands
Lack of redundancy in water utilities	Capability	Provide more interconnections between GWA and DoD water utilities		Increased risk of service interruptions due to infrastructure failures, weather events, or other threats
Lack of reliable power generation for the water wells	Capability	Develop and implement a plan to enhance power availability for water wells		Increased risk of water supply interruptions to some areas and reduced resiliency
Overall shortage of water storage capacity	Capability	Develop and implement a plan to address water storage capacity issues		Increased risk of water scarcity and especially during drought conditions

Table 4.1 Gap Strategy and Impact Plan (Continued)

Gap	Type of Gap	Strategy/Program Need	Impact Rating	Impact if not Addressed
Lack of designated fire water supply source	Capability	Develop and implement a plan to increase fire water storage		Potential for inadequate fire fighting capabilities in some areas
Capacity to meet fire flow requirements unknown	Data	Conduct a study to determine if the distribution system meets fire flow requirements		
PFAS in water system	Capability	Treat PFAS contamination		Consumption of contaminated drinking water poses an increased risk of reproductive, developmental, immune system, hormonal, and other health issues including cancer
Condition of wet wells unknown	Data	Conduct a wet well study		
Capacity of the potable water distribution system unknown	Data	Conduct a study to determine the capacity of the potable water distribution system		
Wastewater collection system capacity inadequate for current conditions	Capability	Conduct a study to identify strategies to increase wastewater collection system capacity		High potential for system failure, resulting in backups and health hazards
Wastewater collection system capacity unknown	Data	Conduct a study wastewater collection system study		
Impacts from metals released from the combined outfall not fully analyzed	Data	Conduct a study to assess impacts of metals in water from the combined outfall		
Road Infrastructure				
Lack of alternative routes in road network	Capability	Develop alternative routes to accommodate closures, flooding, and other hazards		Major road closures may significantly reduce vehicular mobility, impacting DoD missions
Lack of road network resiliency	Capability	Strengthen, expand, and improve road infrastructure to withstand the impacts of climate change and rising sea levels		Road closures due to damage may significantly reduce vehicular mobility, impacting DoD missions

Table 4.1 Gap Strategy and Impact Plan (Continued)

Gap	Type of Gap	Strategy/Program Need	Impact Rating	Impact if not Addressed
Stormwater Management				
Undersized stormwater culverts	Capability	Expand the size and capacity of existing culverts to mitigate flooding		Potential for flooding will remain high in some areas, potentially impacting DoD missions
Lack of sediment erosion control	Capability	Conduct erosion control studies		Potential stormwater infrastructure failures
Port Authority of Guam				
Inability to replace gantry cranes	Capability	Replace the three damaged gantry cranes		Increased incidence of failures and need for repairs over time as cranes age and deteriorate, resulting in reduction in port capabilities
Funding source for gantry crane replacements	Capability	Provide funding and plan for replacement of cranes is needed		Increased risk to port capabilities over time as cranes age and deteriorate
Disrepair of Gulf Pier	Capability	Repair the Gulf Pier after damages sustained from Typhoon Mawar		Continued loss of ship berthing capacity
Department of Labor				
Uncertain status of Guam's H-2B visa exemption renewal	Knowledge	DOL to confirm renewal of Guam's exemption from two H-2B visa requirements		Impacts to Guam's ability to issue visas to temporary construction workforce
Inadequate workforce housing available	Capability	Estimate the deficit and identify strategies to create new housing		Continued impacts to housing inventory for Guam residents, and increases in rental costs
Unknown private construction projections	Data	Meet with private construction companies to understand their project projections		

Table 4.1 Gap Strategy and Impact Plan (Continued)

Gap	Type of Gap	Strategy/Program Need	Impact Rating	Impact if not Addressed
Guam International Airport Authority				
Guam International Airport capabilities	Capability	Address staff shortages		Potential impacts to airport operations and expansion capability
Guam Memorial Hospital				
Insufficient capacity to meet current medical care demands	Capability	Address space requirements for hospital beds		Continued impacts to the hospital's capacity and ability to provide adequate healthcare
Shortage of staff and supplies	Capability	Address staffing and supply shortages		Continued impacts to the hospital's capacity and ability to provide adequate healthcare
Outdated IT and utility infrastructure at Guam Memorial Hospital	Capability	Address IT and utility infrastructure improvements needed at Guam Memorial Hospital		Potential losses in efficiency, quality, and reliability of healthcare services

4.2 ANTICIPATED TIMELINE

The suggested execution strategies to fulfill these gaps will enable both DoD and GovGuam to collaborate on scope, timeline, and resourcing of potential projects. As the gaps are programmed and added to the Guam Construction Capacity & Synchronization (GCAPS) tool, along with the GovGuam Project list, areas of overlap or lack of coverage will become apparent, allowing leadership to reprioritize/rephase, as needed. The combined GCAPS tool will also highlight if there are precursor projects that need to be in place before significant mission movements, such as water/power upgrades, road improvements or port capabilities.

4.3 KNOWLEDGE GAP UPDATE

During the DoD interviews in March 2024, key knowledge gaps were identified to be validated with GovGuam. [Table 4.2](#) summarizes the knowledge gaps that were resolved during the July 2024 GovGuam interviews.

Table 4.2 Knowledge Gaps Resolved

KNOWLEDGE GAP	RESOLUTION
Condition and capacity of GovGuam utilities	Met with GovGuam to determine existing conditions and capacity of utilities and to understand GovGuam's DoD population growth projection assumptions.
Understanding the effects of diminished Port of Guam capabilities post Typhoon Mawar on DoD buildup	Met with PAG to discuss Port of Guam capabilities and impacts sustained from Typhoon Mawar. The replacement of the gantry cranes and repair of the Gulf Pier are priority projects for PAG.
Analysis of telecommunications support for the expanded Army mission, anticipated mission growth, and requirements for the new Joint Task Force – Micronesia headquartered at Nimitz Hill	Met with the Broadband Infrastructure Office and confirmed the current telecommunications infrastructure was adequate, had sufficient capacity, and had the capability to grow to accommodate the anticipated mission growth.

GCAPS TOOL

The GCAPS tool was designed to facilitate the interactive building of alternate project implementation scenarios that combine construction execution capacity mitigation strategies and schedule adjustments. It allows for the prioritization of projects by analyzing project execution capability based on real-world capacity factors and decision-making scenarios.

4.4 DOCUMENTS REVIEWED

Several documents were provided during the July 2024 interviews. [Table 4.3](#) lists the provided and reviewed GovGuam-furnished documents list.

Table 4.3 GovGuam-Furnished Documents List – Site Visit 7/2024

GovGuam-Furnished Documents List – Site Visit 7/2024
Guam Housing Authority Capital Improvements Project List, 31 May 2024
Guam Waterworks Authority Testimony on Bill 274-37 in Support of the FY2025-FY2029 Financial Plan & Capital Improvement Program
Guam Power Infrastructure Resiliency Plan: Physical Infrastructure, 25 April 2024
Guam Military Build-up Power Grid Readiness & Resiliency Plan – Utility Initiatives & Project Prioritization/ Considerations, 25 April 2024
Guam Transportation Improvement Program, FY2020-2023, No.1
Guam Memorial Hospital Authority Strategic Plan 2023-2027, June 1 2023

4.5 CONCLUSION

In conclusion, capability gaps identified in this study must be addressed through follow-on studies and projects to resolve capacity shortfalls, service shortages and other deficiencies. Based on the detailed information provided in the GovGuam gap analysis results, several key conclusions can be drawn:

- The gap with the most severe impact if not addressed is the inadequate availability of workforce housing.
- GovGuam does not have a clear understanding of DoD population growth projections.
- Vulnerabilities exist with the continued reliance on external fuel deliveries.
- There are apparent risks associated with the current overhead electrical distribution lines.
- Vulnerabilities exist in the water utility systems, including the lack of redundancy in water utilities and lack of reliable power for the water wells. Additionally, there is a shortage in water storage capacity.
- Comprehensive studies and assessments are needed to determine the full extent of existing conditions and capacity issues related to GovGuam infrastructure and utilities.
- Gaps in Guam's transportation network require resolution, including the lack of alternative routes and road network resiliency.

- Two key projects are needed to ensure future reliability of the Port of Guam, including replacement or repair of the gantry cranes and repair of the Gulf Pier.
- Guam Memorial Hospital has insufficient capacity to meet the current medical care demands, including staffing and medical supply shortages. Additionally, improvements to IT/COMMs at the hospital are needed.
- Gaps identified with unknown impacts pose a risk due to their unknown nature. Further studies are needed to develop a better understanding of these gaps and the impacts if not addressed.

Gaps in information and understanding will be addressed through comprehensive, island-wide master planning. The master plan will pave the way for holistic solutions to resolve civilian shortages and deficiencies that also impact the DoD installations and their ability to meet their mission and service operational deadlines.

The Guam DoD Master Plan will benefit the Guam civilian population as well as the DoD installations, providing a comprehensive framework for improving the overall infrastructure and critical networks on Guam.

Capability gaps must be addressed through follow on studies, projects to address capacity deficiencies, and integrated master planning.

CONCLUSION

Critical gaps exist in GovGuam's understanding of DoD population growth projections. Continuous coordination and information-sharing between DoD and GovGuam stakeholders will be essential to successfully deliver the necessary infrastructure and capabilities on time to support the Guam DoD Master Plan.

APPENDIX A

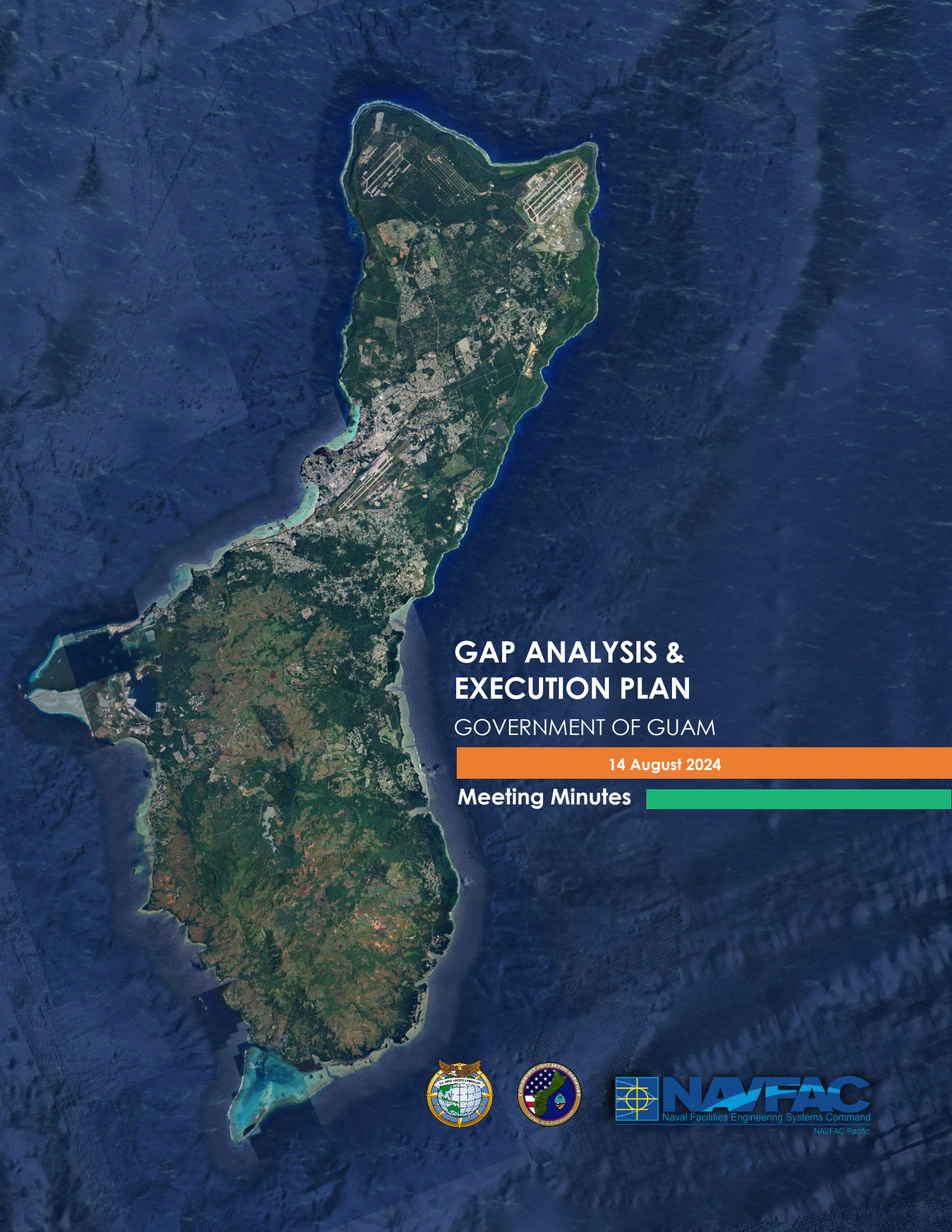
ACRONYMS



A1.1 Acronym List

Acronym	Definition
AAFB	Andrews Air Force Base
BSP	Bureau of Statistics and Plans
CCU	Consolidated Commission on Utilities
CDLO	Community Defense Liaison Office
CIP	Capital Improvements Plan
DoD	Department of Defense
DOL	Department of Labor
DPHSS	Department of Public Health and Social Services
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
GCAPS	guam construction capacity synchronization
GEPA	Guam Environmental Protection Agency
GFD	Guam Fire Department
GHURA	Guam Housing and Urban Renewal Authority
GIAA	Guam International Airport Authority
GMHA	Guam Memorial Hospital Authority

Acronym	Definition
GMHA	Guam Memorial Hospital Authority
GovGuam	Government of Guam
GPA	Guam Power Authority
GSWA	Guam Solid Waste Authority
GWA	Guam Waterworks Authority
M	million
Master Plan	Guam DoD Master Plan
mgd	million gallons per day
MS4	Municipal Separate Storm Sewer System
PAG	Port Authority of Guam
SCADA	Supervisory Control and Data Acquisition
TMG	Transportation Management Group
U.S.	United States
USACE	U.S. Army Corps of Engineers
WWTP	Wastewater Treatment Plant

A satellite map of the island of Guam, showing its coastline, urban areas, and green spaces. The map is oriented vertically, with the northern tip at the top.

GAP ANALYSIS & EXECUTION PLAN

GOVERNMENT OF GUAM

14 August 2024

Meeting Minutes





PREPARED FOR:

Department of the Navy
NAVFAC Pacific
INDOPACOM

Project Number N62742-21-D-0200

PREPARED BY:



733 Bishop Street, Suite 2590
Honolulu, HI 96813

AECOM

999 Town and Country Road
Orange, CA 92868

TABLE OF CONTENTS

Acronym List	4
Overview	5
Bureau of Statistics and Plans	6
Guam Power Authority.....	7
One Guam	9
Guam Waterworks Authority.....	13
Port Authority of Guam	18
Department of Public Works	21
Guam Department of Labor	24
Broadband Office	27
Guam Environmental Protection Agency	29
Guam Housing & Urban Renewal Authority	34
Health, Emergency, and Disaster Response.....	38
Consolidated Commission on Utilities	41
Guam International Airport Authority	43
Attendee List	53

Acronym List

ABBREVIATION	DEFINITION
AAFB	Andersen Air Force Base
ALPCD	Alien Labor Processing and Certification Division
ARFF	aircraft rescue and firefighting
AWIA	America's Water Infrastructure Act
BAH	Basic Allowance for Housing
BESS	battery energy storage systems
BSP	Bureau of Statistics and Plans
CCU	Consolidated Commission on Utilities
CDLO	Community Defence Liaison Office
CIP	Capital Improvement Plan
CMCC	Civil-Military Coordination Council
DoD	Department of Defense
DOL	Department of Labor
DPHSS	Department of Public Health and Social Services
DPW	Department of Public Works
EIS	Environmental Impact Statement
EMS	emergency medical services
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
GDS	Guam Defense System
GEPA	Guam Environmental Protection Agency
GFD	Guam Fire Department
GHURA	Guam Housing and Urban Renewal Authority

ABBREVIATION	DEFINITION
GIAA	Guam International Airport Authority
GMHA	Guam Memorial Hospital Authority
GPA	Guam Power Authority
GWA	Guam Waterworks Authority
ISP	Internet Service Provider
JRM	Joint Region Marianas
LNG	liquified natural gas
MCBCB	Marine Corps Base Camp Blaz
MDA	Missile Defense Agency
mgd	million gallons per day
MW	megawatt
NAVFAC	Naval Facilities Engineering Systems Command
NBG	Naval Base Guam
NDAA 2025	National Defense Authorization Act for Fiscal Year 2025
OHA	Overseas Housing Allowance
PAG	Port Authority of Guam
PFAS	per- and polyfluoroalkyl substances
PSI	pounds per square inch
PV	photovoltaics
SCADA	supervisory control and data acquisition
SHPO	State Historic Preservation Office
TMG	Transportation Management Group
TSA	Transportation Security Administration
USACE	U.S. Army Corps of Engineers
WWTP	Wastewater Treatment Plant

Overview

In preparation for the Guam Department of Defense (DoD) Master Plan, a Gap Analysis process has been implemented to identify both data and capability gaps related to island-wide, long-range sustainment of DoD forces on the island. The first step in this process is to identify and analyze gaps in knowledge of existing conditions, as well as gaps in infrastructure and service capabilities and capacities. The Gap Analysis will also include an Execution Plan that proposes actions to address the identified gaps.

The Gap Analysis and Execution Plan process involves an interview and data collection process that has two major parts:

- Part 1A: DoD interviews and data collection – February 2024
- Part 1B: Government of Guam (GovGuam) interviews and data collection – 08–12 July 2024

The meeting minutes that follow are a summary of the interview findings from the Part 1B Interviews with GovGuam organization representatives.

Bureau of Statistics and Plans

Meeting Details

Project Number	N62742-21-D-0200
Date	08 July 2024
Time	0900-1200 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. Matthew Santos, BSP Deputy Director

Bureau of Statistics and Plans Discussion

1. The 2050 Sustainability Plan created by the Guam Bureau of Statistics and Plans (BSP) includes a Coastal Management Program. Surveys have been conducted for the last year. A draft of the plan should be available soon.
2. A GovGuam Master Plan was completed but never approved by the Guam government.
3. A Compatible Land Use Plan was created in 2015.
4. A Safe Hazard Mitigation Plan was recently completed.
5. The Governor of Guam recently updated the Capital Improvement Plan (CIP), but the project list still needs to be finalized and reviewed once more.
6. Projects undertaken by BSP include Watershed Management, Coastal Management, Environmental Impact Statements (EISs), and Environmental Assessments.
7. BSP is the storehouse for all Geographic Information System (GIS) data on island.
8. BSP is responsible for the census update. The count in 2020 was likely low because it had to be accomplished manually. Demographics have changed on island since that time. The Transient population has increased and is not included in the census count because many are not U.S. citizens.

Known Projects on Island

9. Two solar projects are in review. One is located at Marine Corps Base Camp Blaz (MCBCB) and the other is near the old golf course.
10. There are three large housing subdevelopment located near Andersen Air Force Base (AAFB) and MCBCB.
11. Several hotel developments are in review near Tumon.

Request for Information

1. BSP GIS data.

Guam Power Authority

Meeting Details

Date	08 July 2024
Time	1500-1730 (GST)
Location	Guam Power Authority, Guam Water Authority Headquarters Building
Stakeholder Participants	See Appendix

Guam Power Authority Discussion

1. Key take-aways regarding the electrical service throughout Guam:
 - a. Communicate Navy's electrical distribution system needs to Guam Power Authority (GPA).
 - b. Define housing power requirements for New Mission Tenants; estimate delineation between on- and off-base housing agnostic of the 100-megawatt (MW) growth projection for the DoD planned projects.
 - c. Identify funding sources for projects outlined in the One Guam Power Infrastructure Resilience Plan.
 - d. Mutual benefit of the four proposed battery energy storage systems (BESSs) of 180-MW capacity throughout the island.
 - e. Reliance on fuel imports presents vulnerability to threats and market conditions, resulting in supply uncertainty, price volatility, and high costs.
 - f. Transitioning to an electrified grid requires extensive infrastructure upgrades.
2. The current peak demand on GPA's electrical grid is 257 MW, with an estimation of a 100-MW growth from DoD planned projects, totaling a future demand of approximately 360 MW (excluding future housing needs) by 2045.
3. As of fiscal year (FY) 2024, GPA has approximately 350 MW of primary generation capacity, 85 MW of renewable generation, and 60 MW of BESS shifting capabilities. GPA has a total of nearly 500 MW of generation capacity to support the existing peak demand of 257 MW.
4. By FY 2028, GPA will have experienced an expansion in capacity to approximately 1.2 gigawatts (1,200 MW) of generation and storage capacity, bringing online the Ukudu Power Plant, Tenjo Annex Diesel Units, additional peaking diesel units, and Phases II and IV of GPA's Renewable Portfolio Standards plan.

5. GPA has performed ongoing efforts to harden the generation and transmission systems. Typhoon Mawar (2023) tested the integrity of the systems and recovery capabilities. GPA was able to significantly mitigate the impacts of Typhoon Mawar with proactive improvements including spare parts inventory.
6. Electrical transmission poles have been standardized on concrete or steel poles instead of wooden structures, and approximately 95-98 percent of poles were sustained during Typhoon Mawar.
7. There are plans in place to continue initiatives to add underground transmission lines in supplement to overhead lines, including adding a segment that would complete an underground looped configuration for the northern area of the island to support many DoD installations including AAFB.
8. GPA has plans to contribute to the reduced reliance on fuel imports with commissioning the Ukudu Power Plant and onboarding utility-scale BESSs and solar photovoltaics (PV).
9. The Ukudu Power Plant will be dual-fuel, capable of running off liquefied natural gas (LNG) as the primary fuel and low-sulphur diesel for redundancy. An LNG pipeline is to be installed alongside the construction of the power plant. This pipeline will enter through the Port of Guam.
10. GPA anticipates the ability to reduce electricity rates for the island by approximately over 10 cents per kilowatt-hour after bringing the Ukudu Power Plant online, then further reducing rates from integrating additional renewable energy deployments through solar PV and BESSs.
11. GPA has the capability to remotely monitor and control generation and transmission assets of the electrical system across the entire island (excluding assets not GPA-owned).
12. Communication of DoD's plans for distribution upgrades within installation boundaries with GPA could be improved to ensure cohesion between the operating entities (i.e., Navy and GPA) and systems (i.e., transmission and distribution).

One Guam

Meeting Details

Date	09 July 2024
Time	0900-1200 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Ms. Maria Lewis, One Guam Water/Wastewater Ms. Victoria Zialcita, One Guam Electrical

Electric Power Discussion

1. The proposed projects for the DoD are in the National Defense Authorization Act for Fiscal Year 2025 (NDAA 2025). These projects will receive congressional funding.
2. There are several projects of interest on the NDAA 2025.
3. Deficiencies in power will be addressed by a project for generators at Polaris Point and a project to underground electric infrastructure at Naval Base Guam (NBG). Underground power is preferred over generators as it will not require the use of fuel.
4. GPA would like to underground the existing overhead lines in Northern Guam from Harmen, MCBCB, and GOCE that lead to AAFB. This is not a DoD priority but is still beneficial.
5. Transmission lines around NBG are overhead. There is a proposed NDAA 2025 project to underground the two lines from Piti to Orote and the lines from Apra to Orote. GPA would like to provide secondary/backup power for the Piti-to-Apra lines.
6. The Piti-to-Apra line with a tap to Tenjiro Visa is a project that is still needed. The line is currently 3-4 MW units.
7. The Piti-to-Orote line is owned by the DoD, and the Piti-to-Apra line is owned by GPA.
8. The substation will be moved under NDAA 2025.
9. NDAA 2025 addresses the need for standby generator upgrades for the northern wells. This project does not directly benefit the DoD but has secondary benefits to the DoD. AAFB exports all wastewater to the northern wastewater treatment plant (WWTP). Most water wells are in the northern portion of Guam. NBG currently must supplement the southern portion of the base.

10. Battery storage is of interest for NBG and AAFB for energy storage during low load periods. The DoD and GPA cannot share assets due to the secured and classified nature of the assets. Preference for on- or off-base storage is currently unknown. GPA will own the facilities.
11. The new Ukudu Power Plant will provide sufficient power capacity for demand requirements.
12. Power assets on NBG and AAFB are maintained by a private contractor. It is unclear if GPA could apply to maintain power assets on NBG and AAFB. There are currently discussions to turn Orote Power Plant to GPA, which could lead to increased electrical asset maintenance by GPA. GPA likely has suitable cyber security practices.
13. GPA and DoD infrastructure upgrade plans are listed below.
14. The DoD has added new generators at the main bases, built new substations at NBG, hardened the substations by encasing them, and is including encasing on all new electrical construction.
15. Radio Barrigada needs a new substation, but this project did not get picked up under the Typhoon Mawar recovery efforts.
16. Piti substation needs hardening as the utilities are aboveground and near a major roadway. A third of all power generation comes from this location.
17. A centralized supervisory control and data acquisition (SCADA) system is needed. One system for the whole island would be ideal or be localized by the bases. Currently, one BOS contractor does it for all three bases under one contract. The bases might they want their own contracts.
18. There is a desire to underground the feeder at the Naval Hospital.
19. There is a need for electric vehicle charging stations.
20. LNG is still required for power on Guam, which is shipped from off island. The Ukudu Power Plant will require this fuel.
21. GPA is considering LNG receiving areas and regassification plants near Piti but there are DoD concerns and the potential explosive hazards. A potential backup location is Tanquisson, closer to the power plant.
22. The DoD projects power capacity demand is 100 MW based on all planned DD Form 1391s.

23. GPA is confident there is sufficient capacity to meet the projected DoD power demands.
24. Power demand projects for AAFB was based off planned projects from several years past. Validation is required to determine power capacity.
25. Guam Defense System (GDS) sites run by the Missile Defense Agency (MDA) will generate power and water for each site. The remaining GDS sites will run on generator power. The North Barrigada GDS site is powered by the island. GPA has stated they can only support half of the demand for future projects for GDS. Some of the tactical sites that do not have a large service requirement would be serviced by GPA.
26. The 100-MW capacity for the DoD does not support the MDA projected loads.
27. Housing projects on DoD property may not be accounted for in the 100-MW future demand projection.
28. New construction projects must be reviewed by the State Historic Preservation Office (SHPO) to inform of the likelihood of encountering remains during construction. An archaeological monitor is required during construction. Remains found during MCBCB construction caused delays. Availability of staff is important for construction.
29. A pre-construction munitions of explosive concern survey is also needed.
30. It is unknown what population growth estimate is used by GPA to assess future demand and capacity.
31. There is a gap in knowledge on the number of H-2B visa contractors on island at any given time.
32. Underground utilities are the highest priority for One Guam Power.

Water and Wastewater Discussion

1. The water tanks collapsed after the typhoon. All seven tanks have been repaired.
2. The biggest issue is the power generation for the water wells. Wells are currently using generators for backup power but need to be powered through the electrical system with buried electrical power lines due to the inherent issues with generator refueling in emergency events.
3. Dirty power can affect the pumps and damage the pump prematurely. This dirty power has been an issue on both sides of the fence. Localized power cleaning may be needed at the well locations. This was noted as a Guam Waterworks Authority (GWA) issue and not a GPA issue.
4. GPA controls the generators for the water pumps.
5. The GWA system operations are not optimized to reduce electrical demands during peak electrical needs. The GWA system uses water storage when electrical demands are highest and pumps to refill storage during non-peak electrical hours.
6. There is a shortage of water storage capacity. Additional tanks recently added are at Santa Rita and Santa Rosa.
7. There are over 30 water wells with per- and polyfluoroalkyl substances (PFAS) contamination.
8. Guam Environmental Protection Agency (GEPA) may issue a requirement to treat the Dieldrin contamination found in some wells.
9. The highest priorities for One Guam Water are treating PFAS contamination and creating resiliency with the system by providing more interconnections between GWA and DoD water utilities.
10. Fire water supply is from the main potable water system. Separation of the systems with a potable water system and a separate fire water system will prevent stagnation (smaller potable water lines) and aquifer draw down (use of fire water system for non-potable uses). There is no plan to address this issue. It is unclear who is responsible for maintenance of the fire water system.
11. Funding is not identified to address fire water supply. This may be funded through utility rates or tax basis.
12. GWA still requires solid population growth numbers from Joint Region Marianas (JRM).

Guam Waterworks Authority

Meeting Details

Date	09 July 2024
Time	0900-1200 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. Miguel Bordallo, GWA General Manager

Guam Waterworks Authority Discussion

1. Unlike Navy utilities, GWA is regulated by a public utilities commission. The consolidated commission of utilities is a five-member elected board. Board members approve all projects. There are four divisions in GWA: water production and distribution, wastewater treatment and distribution, along with several different programs under the divisions. On the water side, there are about 43,000 water customers and 1,000 wastewater customers. The northern system is fed from groundwater wells, the central system is groundwater and spring sourced, and the southern system is surface water. For wastewater, there are seven basins but only six treatment plants. Current capacity for the wastewater collection system is unknown. Capacity for potable water distribution system growth and service area is unknown.
2. The Agana WWTP and Northern District WWTP on AAFB process about 5 million gallons per day (mgd), with a design capacity around 10 mgd and the potential for expansion. The WWTPs were designed specifically for the buildup as currently defined. GWA received \$173 million (M) in grant funding from the DoD to manage the water sources. Agana peak flow requirement is 3 mgd. The GWA Northern District WWTP upgraded to secondary treatment and can receive higher volumes of wastewater from AAFB.
3. There are water meters in place for small DoD facilities outside the fences. The current water supply capacity is not adequate for the Marines and Navy installations.
4. A list of projects that have been completed since the 2018 Water Resource Master Plan will be in the 2024 Master Plan update. Pressure zone realignment was a project that was initially included in the 2018 Master Plan and has since been delayed, but GWA has completed a water loss control program that will be updated in the 2024 Master Plan.
5. Currently, the water wells produce 80 mgd maximum capacity, with a current production about 50 percent of the theoretical yield. Some inflow areas are better protected than others, as some areas are more highly permeable.
 - a. Areas that are highly protected have a permitter around the well.

- b. The Water and Environmental Research Institute at the University of Guam has copies of the water capacity review and water supply studies on the University's website. U.S. Geological Survey has conducted studies to examine the capacity of the surface water facility. Pulling water from the "right locations" can help produce a higher yield.
- 6. GWA is advocating to move away from septic systems. Septic systems are regulated by GEPA. GWA used the University of Guam nitrate study to promote sewer expansion projects.
- 7. A third Unregulated Contaminant Monitoring Rule analysis was completed and found PFAS. There are no lead and copper issues on Guam. Synthetic organic chemicals were found in some sites. Disinfection byproducts were found only on surface water. There are no issues with chlorine residuals.
 - a. PFAS is likely a result from the failing septic system, but this is not confirmed. There is an area where no septic system is connected but PFAS is present, so there are other sources of PFAS as well.
- 8. The south surface water treatment plant currently produces 2 mgd. The plant has a rated capacity for 4 mgd, although it has never produced that much. GWA would like to expand to 8 mgd rated capacity. A study is underway for maintenance and repairs and to install a raw water reservoir.
- 9. A watershed study for resiliency planning and a wet well study are needed. America's Water Infrastructure Act of 2018 (AWIA) compliance is underway. Under AWIA, there has been no review of secondary intakes. GWA would like to improve and expand the intakes or diversify water sources (see brackish well).
- 10. Turbidity varies through the year. When it rains, silt gets into the water.
- 11. GWA chlorinates differently than the way the Navy does. The Navy treatment plant uses sodium hypochlorite and GWA uses gas chlorine.
 - a. GWA requires their chemical vendor to always have 6 months of chemical supply available. At the surface water treatment plant, GWA is incorporating similar storage requirements as the chlorine to ensure supply chain resiliency and a smooth procurement process.

12. Water loss is still high at 50 percent to 55 percent. Prior approaches have been to hire a contractor for leak detection. GWA has a water loss control program that sets up 36 Demand Metered Areas across the system; 21 are completed. Some CIP projects are needed for the others. The goal is for coverage three times per year. In areas where GWA has been performing leak detection, GWA has seen significant improvements; however, the water distribution systems do eventually fail again due to aging infrastructure. That is why CIP is needed. Pipes need to be replaced and pressure zone realignment is needed. Phase 1 is complete, and Phase 2 is in progress. GWA is installing stations to keep the pressure in range.
13. The required pressures are 25 pounds per square inch (psi) up to 90 psi levels of service. GWA is trying to get this in the range. While 25 psi is very low for typical U.S. standards, GWA has not received complaints of low pressure.
14. Joint initiatives on water conservation and drought response have been discussed in the past but there is no specific drought response plan.
15. GWA has taken on one reuse project in the northern area to use wastewater for power cooling water.
16. GWA is looking into treatment of brackish water and reverse osmosis treatment in the south to further improve resiliency in water supply.
17. There are no time-of-day rates for power, so there is no incentive for GWA to adjust their operational practices for pumping times. In terms of energy efficiency, GWA is focusing first on increasing reliability before increasing efficiency.
18. Water treatment currently does not address PFAS. This will be a future project. In Guam, it is expensive to use granulated activated carbon and shipping is costly. GWA is looking at ways to destruct PFAS on island. Foam fractionation with destruct has been reviewed by DoD and Guam as a potential alternative.
19. GWA has 120 wells and about 95 wells are active at any given time. There are 10-12 inoperable wells that need CIP rehabilitation. About 23 percent of the CIP is for the PFAS remediation. GWA is considering three centralized treatment centers, each with at least three wells.
20. A septic tank elimination program is included in the 20-year and 5-year plans.
21. GWA has updated the hydraulic analysis since the 2018 Master Plan to change the criteria. Supply storage was not available. Hydraulic analysis has been updated to include transfer across zones. GWA will update the hydraulic analysis in the 2024 Master Plan.

22. GWA is determining what percentage can flow from one place for fire fighting. Fire water flow capacity and needs throughout the distribution system are not known.
 - a. Wastewater lift station capacity has not been studied in much detail. Some switch pump stations need to be replaced, but there is no project to replace them yet. About 30 percent of the CIP is for repairing these stations. GWA must address any issues within 18 months if GWA is performing the work and within 24 months if GWA contracts the work out.
23. Wastewater – National Pollutant Discharge Elimination System-permitted plants have been upgraded.
24. There is no regulation on water loss, so this has not been a priority.
25. A biosolids study confirmed PFAS was present at the WWTP.
26. Capacity upgrades will be addressed in the updated Master Plan.
27. Outfalls were extended in 2009 and there have been no further issues. Outfall diffusers were put in place and modelling was completed to address credits in the permit mixing zone. There were issues with metals in the outfall mixing zone study but proved to not be an issue in the area. Additional studies are needed to determine the right size for the outfall and mixing zone area. GEPA has not expressed any concerns.
28. There is no government-wide or coordinated planning efforts. They are aware of current capacity issues and establish projects to address these, but they do not plan for future scenarios. They know where proposed development is going based on the housing agency, but they are not looking ahead to address future population growth.
 - a. One Guam has helped in collaboration on DoD security issues and previous Air Force issues.
29. Hawaiian Rock Products is the sole supplier for asphalt. Using hot mix asphalt to do repairs is dependent on their schedule. DoD expansion use increases the supply issues of receiving asphalt for other work. Indefinite delivery/indefinite quantity road repair contract bids for GWA were not taken due to these issues. There is no bonding capacity for larger projects.

30. No transmission lines for development plans. These projects happen when developers come in. Look at land use commission and planning.
31. The SCADA system is all manual. Water treatment plants and WWTPs have local control systems. GWA is working on a process to connect them (no SCADA).
32. Customer meters are ongoing issues. Meters are replaced with automated meter reading meters. A pilot for smart meter Advanced Metering Infrastructure systems ride off the GPA network is in the works.
33. Gaps identified between DoD and GWA is combining hydraulic models and the labor pool. Joint-apprenticeship programs could be beneficial.
 - a. GWA desires to supply all DoD systems like GPA in the future. Where interagency operability opportunities exist, GWA would like to move in that direction.

Port Authority of Guam

Meeting Details

Date	09 July 2024
Time	1300-1450 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	See Appendix

Port Authority of Guam Discussion

1. Port Authority of Guam (PAG) is working on a 2023 Master Plan update to be completed in 2024. It includes a list of CIP projects, the goals for each project, and percentage of the projects that will be completed by each fiscal year (2024-2026).
2. The damages sustained from Typhoon Mawar have required coordination with the Federal Emergency Management Agency (FEMA) for repairs. The fuel piers and gantry cranes were damaged. Age of facilities were part of the issue.
3. PAG participates in the Civil-Military Coordination Council (CMCC) task force and is aware of the Guam Infrastructure/Standards Working Group.
4. There is a disconnect from the discussions in the task force to outcomes with real actions. Another issue is funding and lack of congressional representation.
5. The Glass Breakwater is a DoD project, but it is connected to the port properties. The breakwater is 50 years old and has weathered many storms. Funding of \$500M has been allocated for the project. Project bids should begin in the next month.
6. The Build America Buy America Act is one of the biggest limitations to purchasing new gantry cranes. The gantry cranes are Japanese Hibachi cranes with a caterpillar diesel engine and are over 40 years old. They are still fully functional but have exceeded their lifespan. PAG has been applying for grants to purchase new cranes. However, because of the Build America Buy America Act, PAG has been denied. PAG has considered using loans to purchase the cranes instead of the grants, but they must use their own funds and will receive no federal funding.
7. PAG has been working on acquiring fundings since 2012. A total of \$50M was received to make necessary repairs for the military buildup.
8. PAG is adequately staffed and has sufficient laydown area for the military buildup, but new gantry cranes are needed.
9. Once a container is offloaded, the container can be available in less than 24 hours. PAG is hoping to get three new cranes soon; until then, they will continue

to use the old 50-guage gantry cranes. They do not plan to dredge or change the types of vessels that will be arriving to the port. Corrosion control experts keep the gantry cranes in working condition. Occupational Safety and Health Administration (OSHA) inspection and recertification are conducted annually, with a more expansive OSHA inspection every 4 years.

10. PAG currently uses about 50 percent of their yard, so there is room to expand the container storage capacity. They have increased container storage since Typhon Mawar.
 - a. PAG moves over 100,000 containers a year. Matson has changed how they deliver vehicles to Guam. They no longer put the vehicles in a container; they use CONROs and the roll-on/roll-off ramp.
 - b. PAG has a WSP contractor who has worked with PAG since 2007. AECOM will contact WSP. The Master Plan does address increase in throughput.
11. Gulf Pier (the fuel pier) was hit by a floating crane that broke loose from the surge during Typhoon Mawar. The pier is for fuel and cement delivery. PAG is working with the FEMA and the U.S. Army Corps of Engineers (USACE) to repair the pier.
 - a. Cement throughput has diminished due to the need for the pier repairs. Cement was previously pumped directly off the boat to the silos. Now, cement must be offloaded onto a tanker truck and then pumped into the silo. What used to be a 4-day process has become a 7- to 9-day process.
12. Approximately 35 percent of the cargo currently arriving to Guam is for the military.
13. The current volume of construction material moving through the port for the military is 2-3 percent. This estimate could be low but could also account for aggregate only. Cargo for MCBCB will peak in 2024.
14. Hotel Wharf can be used for storage if greater throughput is needed. There are plans for the facility to accept aggregate, roll-on/roll-off vessels and cruise ship activity. About 11 cruise ships dock at Hotel Wharf every year.
15. The cost for repairing and upgrading the Hotel Wharf facilities doubled after COVID. Additional design changes, including buildings codes and seismic requirements, tripled the costs. PAG owns the properties but will need partnerships in place to repair the facilities.
16. Hotel Wharf is long enough to handle a carrier, which requires 500 feet of waterfront; however, 15 feet of dredging would be required to be deep enough. This would further change the design and cost.

17. The storage areas for the port currently stack five containers high and are at 50 percent capacity. There are additional areas with opportunity for storage.
18. Additional priorities for PAG include:
 - a. Water line replacement, which is at 50 percent completion
 - b. Microgrid study for solar panels
 - c. Hardening of warehouses
19. Space is available near berth F6 for an additional gantry crane. The priorities of the port projects are listed in the CIP; however, the two top priorities are the gantry crane replacements and the fuel pier repairs. The port received \$22M in grant funding. Cost estimates for the grants were developed by planners and engineers for PAG.
20. When the port was down because of the typhoon, PAG had to bring in smaller shipping vessels and swing the cargo off ship. This increased the wait time.
21. The port currently can accept large ships like the Daniel K. Inouye. It takes two cranes to offload in less than 24 hours.
22. PAG works with the U.S. Coast Guard on cybersecurity and waterfront training. Due to the size of the agency, 7-9 percent of PAG's annual budget should be allocated to cybersecurity.
23. All Navy commercial activities must go through PAG. Commissary, training materials, and anything that is commercial come through the commercial port and not Navy port.
24. If another typhoon hits Guam, the port is 100 percent insured. However, there are no alternate port locations on the island. PAG is in the process of identifying an alternate port location for Guam and the Commonwealth of the Northern Mariana Islands.
25. Current vessel throughput is nine vessels per week on a high week and two to three on a low week. This includes cement and fuel.
26. To double port throughput, a fourth gantry crane and additional yard space would be needed.
27. If there was a need to double port capacity due to the military buildup, PAG could use the increased capacity.

Department of Public Works

Meeting Details

Date	09 July 2024
Time	1445-1615 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. Vincent Arriola, DPW Director

Department or Public Works Discussion

1. Department of Public Works (DPW) manages the roads. DPW supports road expansions, road hardening, reconstruction, and other projects to address additional vehicle traffic and heavier vehicles. The DoD will be driving these roads daily with heavy vehicles.
2. DPW is hardening the outbound lanes and doing assessments along Route 1 from the Naval Station to MCBCB. This is a \$225M project in today's numbers. Asphalt is a big cost.
3. DPW meets with JRM quarterly. DPW gets \$17M a year in grants, with which they can do small projects or save their funding from multiple years for one big project.
 - a. DPW took this funding and completed a bridge study that included replacement of five bridges. These bridges were repaired. The one bridge not included in the study was the bridge at Polaris Point that flooded frequently.
4. Some roads have no redundancy. There are choke points and if there is an increase in traffic or an accident, or if a road goes down, there is no alternative route for drivers.
 - a. One road acts as a dam. It is in a wetland area and only has one bridge.
 - b. Route 6 up Nimitz Hill would be a suitable alternative route to build up. It is currently only a two-lane road. Route 17, Cross Island Road, is also only a two-lane road and DPW would like to see this become a four-lane road.
5. A document of DPW's CIP projects is available on their website.
6. DPW has right-of-way easements of 80 feet.
7. Currently, the road up to MCBCB (Route 9) is inadequate for the anticipated military buildup. Route 9 needs to be four to five lanes minimum. Base entry points also need to be examined further to see if they need to be expanded.

8. DPW has a stormwater management plan in the works. DPW has an 8-year U.S. Environmental Protection Agency (EPA) stormwater permit for Municipal Separate Storm Sewer System.
9. Tides influence flooding as well. When there are flash floods and high tidal periods, the island experiences the most issues with flooding. Flooding issues are primarily down south and not in northern Guam.
10. The University of Guam has predicted that the southern end of Guam will be underwater soon. Approximately 15 inches of coastline has been lost over the last 30 years.
 - a. DPW needs to expand the size and capacity of culverts to mitigate flooding.
11. DPW has difficulty maintaining sediment control. The stormwater systems have not been maintained. An area near the other end of Tumon floods frequently as it is a low-lying area and accumulates stormwater.
 - a. DPW has street sweepers but does not have jet cleaners. DPW borrows jet cleaners from GWA.
12. DPW manages sewage and telecommunications (privately owned), and all utilities are underground.
 - a. DPW is in a contract to install fiber through the southern ring for redundancy. This project is overseen by the Bureau of Planning.
13. DPW is supporting a fuel farm project that includes 6-7 feet deep of concrete encased fuel lines. The lines go from Piti up Route 6 through the villages into the old Naval Base, then out to Route 16. DPW is doing complete lane replacement on these roads as well. Everything built on Guam is designed for earthquakes per code.
 - a. They ran into water lines while digging the pits for the fuel lines. They do not have a clear understanding of where all the water lines are.
14. DPW has not investigated staging and laydown.
 - a. It is the contractor's responsibility to find staging areas and contractors will often find small landowners to lease land from for smaller staging areas.
15. Guam is running out of rock. Hawaiian Rock brings in basalt for the final road layer. They also use polymers and resins. Hawaiian Rock is opening a concrete batch plant by MCBCB.
16. There is also an issue with abandoned cars and disposal of old cars. The cars must be shipped off island. DPW is also looking into car crushers.

17. DPW is building a biosecurity lab funded by DoD.
18. Guam Regional Transit Authority is responsible for public transportation on Guam. Guam does not have an extensive public transportation system because it is too hot to walk and to wait at a bus stop. The primary mode of transportation on Guam is personal vehicles.
19. There is a government fleet under DPW. DPW received a grant for 20-25 electric school buses. These would be used in central and northern Guam only. There are no plans to further electrify the fleet.
20. DPW has seen the military buildup impact the housing and labor markets.

Guam Department of Labor

Meeting Details

Date	10 July 2024
Time	0830-1000 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. Greg Massey, DOL Alien Labor Processing and Certification Division (ALPCD) Administrator

Guam Department of Labor Discussion

1. Data
 - a. There are a lot of gaps in data. The military buildup was initially supposed to start in 2010 but there were delays.
 - b. Data has been a problem. The Guam Department of Labor (DOL) has been using Manning Guara's Work-In-Place chart for their source of data for projection numbers.
 - c. Building permits are used to determine number of workers needed. This is not a good metric to measure by. The DOL needs better assumptions about the amount of work needed. Getting private-sector data has been challenging. With procurement, people keep their prices close hold.
2. The H-2B visa program is a tedious process. It is important for the DoD project work to be ready and available for the workers once they arrive or have secondary forms of employment available for the workers until DoD project work commences.
3. The largest sectors of employment across Guam are water, roads, and power.
4. H-2B Visas
 - a. Guam uses the H-2B worker visa program in a unique way. Guam is exempt from the 66,000-worker limit and exempt from the temporary need requirement. This exemption will expire in 2029.
 - b. The DOL is actively trying to extend the same exemptions for 5 additional years if possible. Should the exemptions not be renewed in 2029, H-2B visas will sharply decline.
 - c. The H-2B visas are a 3-year program and are extendable. The applications are approved by the DOL with the U.S. Citizenship and Immigration Services. The Governor is the certified processor for these visas. The workers must return to their home countries to reprocess their visas every 3 years.

- d. Apprenticeships were suggested to help motivate young people to work in construction.
 - e. H-2B workers can support any contract for construction, repairs, or services that are directly connected to or associated with the DoD. There are exemptions for contracts for projects that are not directly connected to or associated with the DoD but are supporting the DoD (such as DoD housing projects), or contracts for projects that are adversely affected by the DoD (such as projects for off-base schools). Medical contracts are also exempt from the requirement to be connected or associated with the DoD; any allied healthcare employer can bring in H-2B workers under the exemption if they service both military and local. The biggest need is nurses.
 - f. The DOL has a process to prove that there is insufficient workforce on Guam. There is no exemption for this requirement.
5. There is currently not enough workforce housing.
- a. Core Tech International developed an 18,000-bed workforce housing area near Two Lovers Point .The Department of Land Management approved this project from a zoning perspective, but GWA required construction of a WWTP to serve this population. The project needs to be approved by other agencies before the population can move in.
 - b. Other traditional barracks have some capacity but not enough. Workforce housing must be in a light industrial-zoned area and has sewage services. Pacific Rim is building a 600-bed facility. This project is about 1-2 years out. Nan, Inc. and Black Construction have successfully built barracks. Smaller construction companies consider renting out apartments for their workers if they cannot build workforce housing. This affects the local residents and housing availability.
 - c. The DOL has considered using other parcels for workforce housing. The DOL has also considered opening other types of zoned areas. The use of Chamorro Land Trust Commission land has been suggested, but there is no existing infrastructure.
6. The Bureau of Labor Statistics website (<https://BLS.Guam.gov>) is the best source for unemployment rate, which is currently around 4-5 percent on Guam. Once tourism increases, there will be increased need for staffing and construction.
7. Guam can receive 100,000 H-2B workers if needed. The limiting factor is the availability of housing and services for these workers. The contractors should build workforce housing and Naval Facilities Engineering Systems Command (NAVFAC) should consider if it will subsidize housing.
8. The DOL does not have a clear understanding of the anticipated military buildup projections.

9. The DOL used hotels for Typhoon Mawar recovery workforce housing, but OSHA had stringent housing requirements. Hotels usually meet these requirements except for the zoning. They fought this and won. Hotel Santa Fe Guam is empty after experiencing bankruptcy issues. Some smaller hotels are used for temporary workforce housing. This currently is not an issue but could be as tourism increases in the future.
10. Currently, there are around 5,000 H-2B workers. The highest was around 7,000 workers.
11. Because there are no large housing facilities available, the contractors occupy a large portion of the available local housing, which affects local residents. Housing agency section 8 rates increased because they could not keep up with the military. As the military buildup increases and local residents are impacted, there will be more community push-back.
12. DoD should be posturing for the shortage of housing and the gap for construction equipment mechanics.
13. The hotel and restaurant associations need workers, not because of the buildup but because of COVID and Typhoon Mawar.
14. H-1B and H-2B Visas
 - a. Any changes to the H-2B visa program would require a federal action.
 - b. The Commonwealth of the Northern Mariana Islands program is under the U.S. DOL. The Guam program is under the Guam DOL. The DOL prefers to keep these programs separate.
15. Are there plans to expand or extend requirements under the visa program or streamlining the process?
 - a. The DOL has tried under the Trump Administration but was denied.

Broadband Office

Meeting Details

Date	10 July 2024
Time	1330-1400 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Ms. Melissa Bettis, Broadband Office Acting Director

Broadband Office Discussion

1. The Broadband office is administering two grants: one for the broadband access and deployment program (affordable, reliable high-speed internet off bases) and one for the Digital Equity Act.
2. The Broadband office does not have visibility inside the fence line. The DoD uses a different internet provider through a separate contract.
3. The Broadband office uses the Federal Communications Commission (FCC) broadband map, which is based on service. Areas that are unserved or underserved are prioritized for the grants based on the FCC broadband map.
4. Guam received \$156M after Typhoon Mawar for infrastructure repairs. The dominant Internet Service Providers (ISPs) try to maintain their areas and have been laying overhead fiber. Another reason these efforts have been accelerated is due to the new presence of Star Link, which began residential services on Guam in December 2023. They have less than 5,000 serviceable homes, which will not utilize all the funding. The additional funding will be used to implement the Digital Equity Act.
5. The Broadband office is going through the challenging process of determining the number of locations that are eligible for funding based on census tracts. Nondeployment and other factors are considered.
6. The Broadband office will have sufficient capacity and services for the existing population after these upgrades. They have a plan for additional coverage due to population increase and changes in broadband requirements.
7. There is competition between the ISPs, so there should not be any issues with accommodating new mission tenants and supporting service providers.
8. There is a Bridge Investment Program grant for \$13M to serve southern Guam that an ISP has won and another grant for new fiber lines.
9. About 70 percent of Docomo Pacific overhead cables were downed during the typhoon; underground fiber is better suited against typhoons and storm events.
10. The Broadband office is planning to expand satellite services to some areas.

11. Google is bringing a subsea cable to Guam.
12. The Broadband office and DoD are separate entities with little association. The Broadband office coordinates with the Guam Homeland Security in case of emergencies and for cyber security.
13. Cyber security issues
 - a. One of the Broadband office's plans is to complete an assessment of the Guam network to see if they can take advantage of new technology, like cloud-based services and better reliability.
 - b. Buried fiber is always preferred/safer infrastructure for potential threats from foreign entities but overhead lines meet the standards. Very little fiber is underground currently.
 - i. Overhead fiber is at risk during typhoons.
 - ii. Undergrounding would be a huge effort if factoring in permitting process. Permitting could take years. If this could be tied to potential benefits for all utility upgrades, they could see funding come through for it that way.
14. Built-in redundancy
 - a. ISPs are separate recipients and there are criteria that score higher such as undergrounding. Redundancy will be built in with satellite.
15. Future needs include emergency medical services (EMS) to become hotspots in case of an emergency and patrol car cameras.

Request for Information

1. Guam Office of Infrastructure Policy & Development, Spending Priorities Document.

Guam Environmental Protection Agency

Meeting Details

Date	10 July 2024
Time	1500-1630 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. Nicholas Rudley, GEPA Acting Administrator

GEPA Discussion

1. GEPA works with its Region 9 counterparts in San Francisco. Majority of their funding comes through a consolidated grant through Region 9. GEPA receives little local funding. Every 5 years, GEPA submits a 5-year work plan to Region 9 to be eligible for funding.
2. GEPA is governed by a nine-body board of directors. Board members are nominated by the governor and voted in to serve 3-year terms. GEPA also acts as an adjudication board when the U.S. EPA finds someone who is in violation of a local statute of limitation.
3. GEPA is governed by all federal acts.
 - a. Guam Safety Drinking Act mirrors the U.S. EPA's Clean Water Act. GEPA statutes are as stringent or more stringent than the U.S. EPA.
 - b. GEPA is more known for environmental clearances for permits than the U.S. EPA. Both commercial and civil permit applications go through the DPW. GEPA runs applications through all their programs.
4. GEPA has three divisions:
 - a. Air and land division includes solid waste management program, hazardous waste, pesticides, air pollution control, brownfields and DoD and State/Territorial Memorandum of Agreement Program (Comprehensive Environmental Response, Compensation, and Liability Act or Installation Restoration work, interface with USACE for flood work). Hazardous waste personnel deal with aboveground and underground storage of regulated materials. Pesticide enforcement program is tasked with Federal Insecticide, Fungicide, and Rodenticide Act and ensures applicators are trained and certified. Air revolves around emissions for standby generators.

- b. Water is the most challenged division. It is hard to recruit and train personnel, especially those with a Professional Engineer certification. GEPA often loses employees to the DoD or other autonomous agencies that do not rely on local legislation (GWA for example).
 - c. Environmental monitoring and analytical services, including recreational beach monitoring. This division handles water quality certification. This division is responsible for point source and non-point source discharge permits. They have a shared oversight with the Guam Coastal Management.
5. GEPA engagement with DoD projects
- a. All permits go to GEPA for each division to review.
 - b. The GEPA has been known for long review periods. Some projects take multiple department reviews, especially when there is clearing and grading or altering stormwater drainage involved.
 - c. The GEPA has three DoD/NAVFAC liaison personnel embedded in their department to help expedite the permit review process. DoD funded this initiative.
 - d. It is not uncommon for the GEPA to take 6 months to review an application. Size, scope, and priority of the project will determine how quickly the review can occur. GEPA might issue a hold letter that highlights deficiencies to address, which can delay the process. This process can take up to 2 years or longer, with 6 months being more standard.
 - i. This is important to communicate to leadership.
 - ii. Make sure to include environmental compliance timelines.
 - e. GEPA is cautious of overlooking issues in DoD projects based on experience.
 - f. Currently, there are over 30 ongoing reviews of the DoD applications.

g. Application review issues

- i. Compliance with the stormwater management program is something they look for. Sometimes there are issues with the engineering calculations that need to be recalculated. Usually, they find issues with the volume calculations for stormwater infiltration and Best Management Practice (BMP) installation and management of project stormwater. These require an ongoing stormwater management plan for construction and operations and a lot of clearances require post construction management. Often there are issues of determining who is responsible for monitoring and management.
- ii. Stormwater management is required by federal regulation, but the manual of practice is not a law but is a governor's executive order. GEPA is looking at formally codifying that manual of practice. They need to do an economic impact assessment.

h. Communication between the contractor and applicant is important. The DoD liaisons have been helpful with this.

i. Collateral impact to private sector

- i. There is an affordable housing shortage on Guam. Smaller projects can see delays while GEPA deals with larger DoD projects. For a three-bedroom house permit review, GEPA previously could complete the review in 10 days, but now it takes over a month.

6. Current concerns related to environmental protection on the island

- a. Stormwater and erosion control are related. Strict compliance for stormwater is needed to prevent erosion.
- b. Midway through the pandemic, there was a solar farm project in central Guam. GEPA had limited capacity at that time, but there were certain construction activities they were able to review and approve. The solar farm project did not follow the stormwater management plan that the GEPA approved. The contractor did not install infiltration systems and impacted a spot known as Marble freshwater cave. One heavy rainstorm deposited a ton of sediment and silt into the caves. The contractor submitted plans on how to clean it up, but that method has never been done in there. The project would trigger SHPO review because there are cave paintings.

7. Current challenges the GEPA faces on Guam
 - a. Staffing issues. There is limited interest in being a GEPA inspector on Guam and recruitment is continuous. GEPA goes through the Department of Administration for hiring/human resources.
8. Landfill
 - a. AAFB is closing out their landfill. Guam's landfill is not permitted for hazardous waste disposal. No hazardous waste disposal is available here and waste to energy incineration is illegal in Guam. Everything must be shipped off island. Hospitals have incineration for their biowaste but that is regulated and permitted by GEPA.
 - b. Zero waste management plan is under GEPA. Every recycling facility has a limit on how much the facility can hold. The facilities will store recycled materials until there is a market that favors those items. Used oil will become a problem. Once the old Cabras Power Plant is decommissioned and the new Ukudu Power Plant comes online, used oil can no longer be burned and the price for an oil change/oil disposal will go up. There will be some solid waste issues to address immediately.
 - c. Guam Solid Waste Authority has a better understanding of the capacity for landfill with island-wide population growth projections.
9. Current volume of GEPA reviews
 - a. They are not currently adequately staffed and not for the buildup. They are currently at about half the staff they need. It is well publicized that the GEPA is short-handed. Engineers and inspectors are on continuous announcement.
 - b. There is an opportunity to use H-1B visas for these types of positions: Congressman has inserted language into the National Defense Authorization to include inspectors for them. Housing these personnel on Guam will continue to be an issue. The need for more engineers to review applications has been expressed to the congressmen.
10. GEPA has not conducted any studies on how the buildup will affect island. GEPA oversees the regulatory framework.

11. Current shortfalls/gaps identified by GEPA

- a. Should and when the DoD buildup ramps up, there needs to be full transparency that GEPA will need supplemental staff to have the inspections and engineering reviews occur in a timely manner.
- b. GEPA has a good handle on communicating needs for construction but for operations/management and after construction, GEPA needs more awareness of these requirements.

12. Issues with the septic systems

- a. Two existing laws: Sewage Management and Guam Water Quality Standards. The Sewage Disposal Act (1986) was updated and recently passed by the legislature (Bill 175). The act applies some modern aspects, such as advanced nitrogen reducing systems. Once signed into law, if the lot owners want to build in a groundwater protection zone, they would need to install a much more expensive system.
- b. For PFAS, GWA is conducting 3 years of baseline monitoring per EPA requirements before GWA has to inform customers of contaminants. GWA publishes a consumer water quality report. Septic tanks do not protect against PFAS. Federal counterparts are adamant on the protection of public drinking water.
- c. The recently introduced bill is for local appropriation of funds for the sewage system in the north.

Guam Housing and Urban Renewal Authority

Meeting Details

Date	11 July 2024
Time	0830-1000 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. Fernando Esteves, GHURA Deputy Director

Guam Housing and Urban Renewal Authority Discussion

1. DOL provided an understanding of workforce housing issues from a labor perspective.
2. The Guam Housing and Urban Renewal Authority (GHURA) is responsible for the strategic planning of housing on Guam. GHURA is responsible for urban renewal and community development as well. The agency oversees 37 affordable rental units and houses around 14,000 people. GHURA is a low-income, tax-credit-allocating agency and offers island-wide services.
3. GHURA's statute is like the U.S. for military housing.
4. GHURA has 122 full-time employees, which is generally enough staff. The agency experiences some challenges filling positions and there is often competition with federal government jobs.
5. The main shortfalls GHURA identified include affordable housing and labor availability. Getting projects off the ground can be challenging. Instead of constructing new housing, developers often acquire and rehabilitate old structures. Costs are high, and long timelines put them at risk for losing funding from grants.
6. GHURA's projects are part of a larger plan but they are grant funded. As such, each project is managed separately.
7. A 2020 housing study update was completed and can be found online.
8. Based on population projections, GHURA plans to develop 9,000 housing units by 2027. This projection does not account for the DoD military and dependents, construction workforce, and imported labor.
 - a. The CMCC and DoD need to communicate about the anticipated population growth projections. GHURA does not have a clear understanding of how much housing is needed off-base for military personnel, for workforce housing, and during which phases.

9. GHURA has seen a noticeable disparity between DoD business activities and the local market. Construction workforce for DoD projects often occupies residential housing, displacing local residents. GHURA is trying to understand this issue more deeply and how prevalent this issue is.
10. The *Draft Environmental Impact Study, F-15 Beddown and Infrastructure Upgrades at Andersen Air Force Base, Guam* (Draft EIS) examined housing for Royal Singapore Air Force personnel but did not contain the data needed for a proper analysis.
11. It was previously assumed all military personnel lived on-base, but this is not the case.
12. As a result of military personnel and dependents living off-base, housing prices have increased. In 2022, 88 percent of all active-duty military (Air Force and Navy) was living off-base. This estimate came from realtors and should be verified.
 - a. The Overseas Housing Allowance (OHA) creates a cycle of perpetual inflation. A lot of the military personnel and contractors can afford to pay higher prices and the local community gets displaced.
 - b. There are issues with the existing housing facilities on-base, and many require renovations to be useable.
 - c. Admiral Nicholson honored a policy that required new military arrivals replacing off-base military personnel must live on-base, but there is no guarantee that the next admiral will maintain this policy. It would help to have a system in place to honor this policy and limit on who can live off-base.
13. In addition to homelessness, GHURA examines pent-up demand in overcrowded areas and occupancy of multi-family homes. A study indicated these living situations were not necessarily by choice but by necessity, indicating bigger issues in the housing market. There are approximately 6,000 residents in pent-up demand.
14. Only 12 percent of existing housing units are one-bedroom/studio units. There is a need to push a strategic focus on one-bedroom/studio units.
15. The current average rent for a three-bedroom/two-bath unit is \$2,200, which is close to the OHA. Based on 2020 census data, half of the local population does not make that much money a month. Another portion of the population is burdened, meaning rent costs approximately 50 percent of their monthly income. GHURA would like to see more of the population in the 30-50 percent range. A potential solution could be to pivot from OHA in Guam to Basic Allowance for Housing (BAH). BAH incorporates market values whereas OHA does not.

16. A housing model example, such as London Olympics housing that was constructed for the athletes and converted to affordable housing after the Olympics, was discussed.
 - a. Previously there was temporary workforce housing that was integrated back into the economy. This is not a new concept, but military leadership does not prioritize this option. These housing projects could be either on- or off-base.
 - b. In this assumption, it would be easier and quicker if the DoD built the housing, but a joint GovGuam-DoD option is possible.
17. One option is to have DoD lease the land and build the infrastructure, then return the housing back to the public after use.
 - a. GovGuam could lease land to DoD, or the DoD could lease the land to GovGuam.
 - b. There have been some disagreements on these topics at the CMCC.
18. GHURA's current projections are based on 2019 data. GHURA is working to get another study funded and completed by receiving congressional community development funds.
 - a. A list of other projections they are looking at can become available.
 - b. There are gaps in DoD and GHURA's assumptions on population growth.
19. An island-wide housing master plan can be advocated, using DoD and GHURA's assumptions.
20. Currently, they have a net-zero policy for all DoD activities. All activities must be self-contained and self-sustained with no housing constructed outside of the fence line.
21. The Draft EIS for the Marine Corps moved forward with the assumption that all housing would be on-base, but this was not what happened because of the project.
22. Guam is seeing increased tax revenue from construction, but this has not trickled down in the economy. The top percent has been growing but not the rest of the economy.
23. GHURA's work is on the legislature. The law is very restrictive on where private contractors can develop and that is where they interface the most.
24. Provisions have been used in the past to prioritize local people first and then military, but this could also happen in reverse. U.S. Department of Housing and Urban Development's strategic goal is to build more inventory to create more competition in the market, and the best approach is by limiting military personnel living off-base.

25. GHURA could manage a program if DoD funds it.
26. GHURA has a white paper for how policy can be changed; the governor instituted a sustainable housing working group.
 - a. A letter will be publicized this month challenging the cumulative community impacts of the Draft EIS.
27. Community sentiment is that local residents struggle to afford living here because the military is buying them out.
28. Governor is pushing GHURA to build housing near Eagles Field.
29. GHURA has presented the idea of pivoting from OHA to BAH, but JRM leadership opposed the idea.
 - a. For the presentation to JRM and admirals, focus on what has not been vetted that can be presented to the leadership.
 - b. There have been two published studies regarding the housing issue on Guam; however, GHURA did not know how to determine the fair market rate for BAH.
 - c. When the president declares housing shortage, he can trigger other agencies to get involved. The funding for GHURA planners is not enough.
30. Compare GHURA's baseline assumptions for population projections to the DoD's assumptions as agreed. CMCC does not have clear projections either.
31. A lot of DoD personnel want to be part of the community and live off-base. GHURA wants them to be part of the community as well, but OHA seems to be causing issues.
32. An additional factor is there are indigenous people living on Guam and GovGuam must protect their right to their traditional lands and practices. There are cultural expectations to take care of family members, so when indigenous people are out on the street, it is typically a last resort. These community members need to be protected.

Health, Emergency, and Disaster Response

Meeting Details

Date	11 July 2024
Time	1030-1200 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. Terry Aguon, Deputy Director of Public Health Mr. Joey San Nicholas, Guam Fire Department Fire Chief

Department of Public Health and Social Services

1. Challenges/concerns/needs for the Department of Public Health and Social Services (DPHSS):
 - a. Need of the women, infants, and children program and other services such as child protective services and domestic abuse services: there has been a rise in sexually transmitted diseases among the younger population
 - b. Challenges of local residents include buying or renovating homes
 - c. Workforce housing is subject to environmental health considerations
 - d. Transportation networks
 - e. Infrastructure and utilities
 - f. Processing and treatment of materials and sewage systems in older homes
 - g. Numerous leaching fields and septic tanks concerns in relation to wetlands
2. Positive relationships between the military and the community: military foster parents for local children have made meaningful social service contributions.
3. There is a greater demand for additional staff than there are resources. The DPHSS is working on portions of a Master Plan but needs a better understanding of the projected population growth.
4. Guam wants to build a regional laboratory to support other islands. The DoD is building a new biobehavioral science lab near the University of Guam.

Fire and Emergency Medical Services

1. The Guam Fire Department (GFD) is the primary fire response outside of DoD gates. The GFD has a code enforcement bureau.
2. All fire fighters are emergency medical technician-certified and the GFD has an ambulance and paramedics. The GFD is also responsible for the 911 call center and hazardous material response team. The GFD has search and rescue capabilities, often working with the U.S. Coast Guard. The airport has a fire unit for the airplanes and airfield, but the GFD responds to emergencies in the airport building. They are airfield rescue and firefighting (ARFF) responders as well.
3. The GFD has no shared facilities with DoD. There is a need for J30 to have their own fire station at Skaggs and other high growth areas. DoD assumes that the GFD has jurisdiction over Skaggs, but it is not formalized. DoD does not have fire and emergency assets at Barrigada. The GFD would like DoD to invest in some of the equipment if the GFD builds the station.
4. The GFD has an average response time of 8-10 minutes to 90 percent of all calls depending on the unit and unit availability. The GFD averages about 30,000 calls a year between EMS and fire protection services.
5. The GFD has only 6 of 11 operating fire stations and 3 operating rescue stations. The GFD is building a large station by the police station that includes hazardous response.
6. Water for firefighting is lacking. The GFD currently struggles to meet the needs of the community. There are low water issues and issues with infrastructure, storage, and pressure in the south. Overall, they need to increase the capacity. Firefighting is needed for buildings over three stories, and the GFD must have water available with 60 psi minimum pressure.
7. There is a Guam Emergency Response Plan, and fire and EMS are included in the plan. This document is available on the Guam Homeland Security website.
8. The GFD has an internal response plan for mass causality events. The GFD had to exercise this for airplane crashes in the past.

9. The GFD has an internal fire department typhoon response plan, which DoD is part of. Sometimes they send a representative there in addition to the National Guard, but they do not staff it. DoD's priority during a typhoon is inside the fence line. The installations close the gates and fire services are limited to on-base. DoD fire chiefs send help outside the fence line when they can.
10. The GFD is responsible for off-base military personnel.
11. The GFD would like to have approximately 314 firefighters and currently only have around 195. The population on Guam is around 150,000. Firefighters are typically highly sought-after positions, but they have seen a sharp decline in applications since COVID. They do currently need additional dispatchers, but there is a long-term goal to combine dispatch for fire, police, and EMS.
12. Current/ongoing GFD projects are focused on recovery due to the lack of procurement and purchasing capabilities. A high turnover in personnel and equipment has been noted.
13. Of the DoD buildup, the Army buildup is the most unknown to the GFD. The Army has 16 sites outside the fence line and is not proposing to bring in EMS services. The GFD is anticipating servicing these areas.

Consolidated Commission on Utilities

Meeting Details

Date	12 July 2024
Time	0900-1000 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. Joey Duenas, CCU Chair Mr. Francis Santos, CCU Vice Chair

Electric Power

1. The Consolidated Commission on Utilities (CCU) was created in 2002 as a cooperative. CCU representatives are elected positions. Their goal is to provide reliable and affordable utilities to the people of Guam.
2. Rooftop solar mostly uses grid inverters and needs a grid to operate and batteries for storage.
3. The CCU advocates for the One Guam agenda, with GPA and GWA taking care of distribution lines on the DoD sites.
4. Ukudu Power Plant is coming online while Cabras Power Plant is going offline.
5. GPA was able to keep power available for AAFB. There are two combustion turbines, Dededo 1 and 2, near AAFB. AAFB and MCBCB paid for the undergrounding of the electrical infrastructure, but the last segment from Dededo to the new Ukudu Power Plant needs to be finished to complete the system.
6. CCU sets the cost rates for utility consumption, which are approved by the Public Utility Commission.
7. GPA would like operational control of the electrical assets owned on DoD property.
8. The CCU feels that the best approach is to contract the 132-MW solar system on the DoD property to GPA.
9. Full solar/renewable systems will require more market research to find the right technology for Guam.

Water

1. There are brackish water wells in Tumon and a clean aquifer lens in the north.
2. It may cost \$1M to add a few residents onto the sewer system to reduce reliance on septic tanks in the communities. GWA would like to receive federal funding to help with the conversion.

Stormwater

1. The CCU is open to recycling and reclaiming water in the future but has no implementation plan. The Ukudu Power Plant will use reclaimed water. There is no plan to create a stormwater utility.

Overall Utilities

1. The CCU competes with the DoD for island workforce. Although pay is matched, the CCU cannot offer the same benefits.

Guam International Airport Authority

Meeting Details

Date	12 July 2024
Time	1000-1130 (GST)
Location	Community Defense Liaison Office, Office of the Governor of Guam
Stakeholder Participants	Mr. John Quinata, GIAA Executive Manager Mr. Artemio Hernandez, GIAA Deputy Executive Manager

Guam International Airport Authority Discussion

1. The Antonio B. Won Pat International Airport operated by the Guam International Airport Authority (GIAA) is the only commercial airport on Guam.
2. The Air Force uses the airport for emergency divers when military aircraft cannot land at AAFB. The southern portion of the airport is reserved for military divers.
3. GIAA has fuel trucked to the airport daily from the Port of Guam. This was a challenge during Typhoon Mawar because of truck shortages.
4. GIAA is working on a joint-use underground fuel line, with the potential for a mobile trailer to mix additive to create JP8 fuel without the use of trucks. The rough order of magnitude cost estimate for a feasibility study for this project is \$14M. The joint-use fuel line would allow for continuous filling of fuel tanks while maintaining the trucks as a backup. GIAA would also like the ability to service DoD assets on the south rim. The DoD indicated that this was possible but would need the DoD Secretary's authorization.
 - a. The existing fuel line delivers approximately 1 million gallons of fuel month to the airport, which can be pumped in one day. DoD is estimating a requirement for 20-50 million gallons per month. This estimate was developed through discussions with Defense Logistics Agency but is not documented in an official capacity.
 - b. The project has two components: the connection to the private operator that bypasses the DoD system, and the connection to the settling, mixing, and standby tanks.
 - c. The DoD would prefer JP8 additive mixing to occur at AAFB.
5. The south ramp has capacity of 20 fighter jets and has the length and width to accommodate large aircraft. For DoD exercises, the DoD has its own maintenance crews for support, but the airport fuel handlers mix in the additives.

6. There is a Master Plan underway for the airport led by AECOM. The Federal Aviation Administration is reviewing the plan, which will be finalized by September 2024.
7. GIAA is hoping to expand their airline services for continental U.S. and foreign airlines.
 - a. Foreign airlines cannot service the U.S. through Guam because of cabotage restrictions.
 - b. Guam's congressional delegates are trying to get Guam and the Commonwealth of the Northern Mariana Islands exempt from cabotage restrictions.
8. The terminal can be expanded as needed. On the southern end, GIAA is considering adding new hangars, aprons, and other support facilities.
9. Within the comprehensive scope of airport services, there currently are staff shortages in private organizations such as ground handlers, aircraft servicing (cleaning/maintenance), regulatory inspection staff (during peak periods), food and beverage staff, and a myriad of other specialized services such as foreign currency exchange.
10. The DoD area is fenced off from the main airport. There is a gate that DoD security forces man during their exercises at the airfield. The airfield is secured per Transportation Security Administration (TSA).
 - a. Issues have occurred with DoD not manning the gate.
 - b. The DoD can load and unload at the airport but they cannot have live rounds.
 - c. The airfield is used approximately four times a year for about a month-long period by the DoD. Their presence has no impact on other airport functions.
 - d. The airport does not financially gain from the arrangement with DoD, but there is a small economic benefit. The DoD personnel arrive through the commercial airport, so GIAA benefits financially in that way. As a recipient of Federal Aviation Administration (FAA) funds, GIAA is required to allow DoD use of the airfield, but DoD must not exceed a certain duration or impact airfield operations.
11. There are contingency plans in place in case of an emergency. DoD fighter jets have had to land at the airport when the visibility is poor at AAFB. Other allied nation jets also land at the airport. There are noise impacts to the nearby community.
12. GIAA does not have a clear understanding of DoD population growth projections.

13. The airport's peak arrival is 5,000 personnel arrivals per hour. Early afternoon and midnight are the major peak times. DoD avoids using the airfield during peak times.
14. The airport has two runways—12,000 and 10,000 feet each.
15. The DoD is monitoring airspace restrictions and working on a noise study. Missile defense is what they are concerned about. This could change flight paths depending on where they go. Sometimes the best flight path to mitigate noise impacts is through restrictive airspaces.
16. ARFF and airport police do a lot of joint training. They must be familiar with the aircraft coming in. DoD does its own maintenance.
17. A new cargo apron is at 60 percent design.
18. GIAA saw extreme flooding of airport facilities during Typhoon Mawar. A lot of water, trees, and debris clogged the drainage ditches. The airport experienced ponding in multiple locations, including elevator shafts, stairways, flooding on three floors, water inundation, and on the ramp. The runways and taxiways did not experience ponding. The airport was up and running in 4 days after the typhoon. The fence line was hardened and encased in concrete pre-typhoon and survived the typhoon. GIAA just opened bids for roof repair that will help with inundation. They are removing the carpets and hardening the floors.
 - a. Utilities were an issue during the typhoon. Air traffic control was down, and FAA had to use emergency communications.
 - b. FEMA does not want to fund the airport's Typhoon Mawar recovery efforts.
19. FAA does all air traffic control and has solar energy and its own generators.
20. GIAA has made progress on cyber security but there is still room to improve. TSA has requirements for cyber security plans and mitigations. Management Information Systems is the information technology team. They have a lot of manual processes, which is helpful from a cyber security perspective.
21. FAA has a program for electric vehicles and received a grant for seven electric vehicles and four charging stations. They put the program out to bid and had no bidders. Now they are working through the FAA.

22. GIAA has lost \$150M in revenue since COVID.
- a. There is a potential indirect impact on the airport if the military expansion keeps the hotels booked and tourists cannot find places to stay. The U.S. dollar is currently weak compared to the yen and other Asian currencies. GIAA was expecting recovery by 2025 but this may slip.
23. A limiting factor for the military buildup is the condition and network of the roads.
- a. To get to the DoD south ramp, one must enter on private property. GIAA and DoD are looking for a solution for this. It can get busy when DoD is using this area.
 - b. DPW will harden a bridge on Route 10A that they have issues with.

Request for Information

1. GIAA Agency Briefing.

Guam Memorial Hospital Authority

Meeting Details

Date	01 August 2024
Time	0900-1030 (GST)
Location	Microsoft Teams
Stakeholder Participants	Lillian Perez-Posadas, Hospital Administrator/CEO Rizaldy S. Tugade, Associate Administrator of Operations Rodalyn Gerardo, Deputy Assistant Administrator of Operations

Guam Memorial Hospital Discussion

1. Guam Memorial Hospital is a public, not-for-profit hospital. Guam Memorial Hospital is the sole public hospital on Guam. There are small community clinics that are privately owned and separate from Guam Memorial Hospital.
2. Guam Memorial Hospital Authority (GMHA) would like to work jointly with the military. GMHA welcomes and supports ideas to expand this relationship efficiently beyond the fence line.
3. GMHA has a 5-Year Strategic Plan (2023-2027). This document details GMHA's strategic goals and public engagement strategies. Strategic goals include to achieve financial viability and to engage the healthcare workforce and community, including the military community. A detailed island-wide analysis was conducted to create the strategic plan for the hospitals.
 - a. The 5-year plan quantifies all data on existing conditions and examines how to prepare the hospitals for future military expansion.
4. Guam Memorial Hospital provides additional hospital inpatient services, cardiology, gastrointestinal, laboratory, and radiology outpatient services.
5. Guam Memorial Hospital has a 160-bed capacity with overflow areas in the hallways. More beds are needed. There is an alternate care facility, surgery center, surgical outpatient facilities, and a dialysis clinic on island.
6. Guam Memorial Hospital has one trauma room for cardiology. There is an intensive care unit for patients who require greater level of care. There is a neonatal care unit for birthing and related services. They have a long-term care facility and agreements in place with JRMC. Orthopedic surgeries must be referred out.

7. Guam Memorial Hospital is mandated to serve all members of the community regardless of financial status.
8. GMHA relies on operational revenues and funding from the governor for CIP projects. The legislature relies on subsidies for funding and there are always shortfalls. A roof repair CIP project was recently completed. Other CIP projects include AC projects.
 - a. There is a reimbursement program where the hospital receives reimbursement for certain situations.
9. A small percentage of the DoD population receive care at Guam Memorial Hospital including Veterans.
10. There are collateral agreements in place between the public and DoD hospitals. If someone is experiencing an emergency off-base and the Naval Hospital is the closest hospital, Emergency Services can take the patient on-base for immediate treatment.
11. Guam Memorial Hospital has a shortage of doctors, nurses, allied health service workers, and more. They make do with the staff they have. There are shortages of services, and laboratory and pharmaceutical supplies.
12. Requirements for the hospital have been discussed with the governor. At the trauma center, GMHA would like to establish a trauma center community system and is looking to apply for a trauma center designation. GMHA will be meeting later this month with the Naval Hospital and Regional Advisory Committee to establish a central system on island. Several commanding officers and admirals have personally gone to the hospital to assess their capabilities and shortfalls. Workforce and space requirements are gaps to address.
 - a. Guam Memorial Hospital is looking to the governor to support building a new hospital and medical facilities in preparation for the military expansion. The governor has identified a central site for the new hospital or medical facilities. GMHA is working with GHURA and the governor because they can purchase the land needed for the facilities.
13. There are emergency generators for energy resiliency at the hospitals, underground water storage, and redundancy of some other utilities. Aging infrastructure is a concern.
 - a. The aging infrastructure is currently being addressed in the Strategic Plan. GMHA would like to address these deficiencies more quickly.

14. A joint full-scale emergency scenario exercise is occurring on 01 August 2024. This is a large-scale disaster response training scenario that includes both DoD and GovGuam Emergency and Disaster Response Services. The results of this training scenario should be available in the coming months.
15. A USACE report documents the conditions of the hospitals as of 2019.
16. From a space perspective, there are critical gaps that would be exacerbated by the increase of military personnel plus dependents. Projects to address these gaps need to be sequenced prior to the anticipated military buildup.
17. A lot of patients get sent off island for treatment to the Philippines, Honolulu, or California (depending on their insurance). Patients are also sent to Taiwan and Japan if they are visiting from those locations. DoD can MEDIVAC DoD personnel and/or dependents to Okinawa or Tripler Hospital in Honolulu for treatment.
18. Guam Memorial Hospital collaborates with the Naval Hospital often and would like to see DoD support staffing issues at Guam Memorial Hospital.
19. Logistically, it takes a while to get medical supplies to Guam. Sometimes there are issues shipping medications to Guam and solutions can be very costly. There can be delays in receiving supplies, which present challenges for emergency services.
20. In September, they will launch a new suite for cardiology diagnostics and treatment procedures. There is a shortage of cardiothoracic surgeons on island.
21. Information Technology (IT) is another issue. Better IT infrastructure is needed. Both the software and hardware are issues that can impact documentation of services and payment collection capabilities.
22. Guam Memorial Hospital relies on travel nurses, but this is very expensive. They deployed approximately 90-100 travel nurses pre-COVID. They are trying to reduce the number of travel nurses accepted due to the cost. The University of Guam has a nursing program and Guam Memorial Hospital tries to hire the graduated nurses. The hospital offers a \$5,000 sign-on bonus.
23. There is one vendor on island that generates oxygen. Guam Memorial Hospital relies on this vendor and there is no redundancy; it is also extremely costly. Guam Memorial Hospital would like to provide and generate its own oxygen.

24. ARPA Projects: Chillers, AHUs, various medical equipment (i.e., anesthesia machine, hemodialysis machines, ventilators, CT scanner tubes, stretchers, etc.), firewall, access control/CCTV systems, servers, etc.
25. A key issue is gaining critical access hospital designation. The criterion to meet this hospital designation is extensive. They forgive medical loans for doctors and nurses who come to Guam if the hospital has a critical access hospital designation. This would incentivize doctors and nurses to relocate to Guam for work.
26. Another issue is there are individuals who are housed in the hospital, which is costly and occupies hospital beds reserved for patients. GMHA is working on the community level for housing and support services for these members. Medicare had a program where families are compensated to take care of their loved ones in their homes as an incentive to get them out of the hospital.

Request for Information

1. GMHA Strategic Plan.
2. USACE study (2019).

Guam Solid Waste Authority

Meeting Details

Date	14 August 2024
Time	0900-1030 (GST)
Location	Microsoft Teams
Stakeholder Participants	Irv Slike General Manager, GSWA

Guam Solid Waste Authority Discussion

1. Mr. Irv Slike has managed the collection and disposal systems on Guam for the past 38 years.
2. Guam Solid Waste Authority (GSWA) was created to handle residential refuse (single-family homes, apartments/condos with four units or less).
3. GSWA has 21,000 customers and 40,000 potential customers (bin sharing, transfer stations used by the potential customers). The bin sharing program allows close knit families to purchase a disposal bin to share.
4. GSWA processes 2.3lbs of waste per person per day on average. Most waste goes to Layon landfill. Illegal dumping does not materially affect the tonnage that goes into the landfill.
5. GSWA has 10 refuse trucks and one spare truck and operates on a 5-day collection schedule.
6. The trucks use the public roads for collection services and there is an incremental amount of time needed to add additional customers to the service network. MCBCB was discussing creating their own transfer point to haul directly to the landfill via private contractor.
7. Capacity: 45t/hour at landfill, elastic capacity, can easily do 150t/hour, support population of 500,000. The landfill has capacity to handle the current stream out to 75 years.
8. To develop rate model studies and plug into the population forecasts will require DoD to share the DoD growth projections.
9. AAFB/NBG have inactive landfills with no plans to reactive due to the cost.
10. GSWA collects all DoD refuse through housing or refuse goes to commercial collection before arriving at Layon landfill.
11. Ability for GovGuam to purchase adjacent land to expand if needed.
12. Installations have commercial contracts to pick up bins and/or SFH waste and truck it off installation.

13. There are three private hard fill CDDs on island that will be closed soon and unlined to address ground water issues. Layon landfill will likely be the repository for this material once closed.
14. GovGuam law prohibits incinerators of refuse (Waste to Energy). It is very expensive to make electricity on Guam; solar and wind are less expensive per/kilowatt to make.
15. Recycling materials (metal, cardboard) get shipped off island. Glass is recycled on island, tires are shredded and shipped to India, and scrap metals are handled by the private sector.
16. Initiatives:
 - a. Closure of 23 ac to 35 ac of landfill to cap it and put in a collection system, then cover it with PV to generate approximately 4MW of solar energy near the existing solar farm. As landfill cells are closed out, they will cover the site with PV systems.
 - b. Used cooking oil is collected and transported to the Hilo biodiesel plant. Working to acquire equipment to convert 8k gal /month to diesel fuel. The project would help meet Clear Air Act and GHG emission targets.
 - c. Procurement of three new refuse trucks to meet GHG goals. Will replace diesel trucks.
 - d. Discussion of adding a Saturday collection with additional staff in the interim until additional trucks are procured.
17. During Typhoon Mawar, GSWA staff ran double shifts with the existing fleet to keep ahead of the stream.
18. Resiliency issues: GSWA has generators at their headquarters and at the landfill. The port had decent gas/diesel but experiences distribution issues due to lack of electricity. 10,000 gal tanks were used to fuel trucks until regular fuel deliveries were back on schedule after Typhoon Mawar.
19. GSWA can use the federal GSA procurement system. New electrical trucks are coming through this system.

Attendee List

Stakeholder Attendee List		
Name (First and Last)	Position	Contact Information
Broadband Office		
Melissa Bettis	Acting Director	Melissa.bettis@gmail.com
Bureau of Statistics and Plans (BSP)		
Matthew Santos	Deputy Director	Matthew.santos@bsp.guam.gov
Consolidated Commission on Utilities (CCU)		
Joey Duenas	Chair	Joey49duenas@gmail.com
Francis Santos	Vice Chair	Francis.santos@gpagwa.com
Community Defense Liaison Office (CDLO)		
George Bamba	Special Assistant	George.bamba@guam.gov
Jose Naputi	Senior Planner	Jose.naputi@guam.gov
Albert Santos	Engineer	Alsantos@gmail.com
Vera Topasna	Executive Director	Vera.topasna@guam.gov
Department of Public Health and Social Services (DPHSS)		
Terry Aguon	Deputy Director of Public Health	Terry.aguon@dphss.guam.gov
Department of Public Works (DPW)		
Vincent Arriola	Director	Vince.arriola@dpw.guam.gov
Guam Fire Department (GFD)		
Joey San Nicolas	Fire Chief	Joey.sannicholas@gfd.guam.gov
Guam Housing and Urban Renewal Authority (GHURA)		
Fernando Esteves	Deputy Director	Fbesteves@gmail.com
Guam International Airport Authority (GIAA)		
Artemio Hernandez	Deputy Executive Manager	Ahernandez@guamairport.net
John Quinata	Executive Manager	John.quinata@guamairport.net
Guam Memorial Hospital Authority (GMHA)		
Arthur San Agustin	Not provided	Not provided
Lillian Perez-Posadas	Hospital Administrator/CEO	lillian.perez-posadas@gmha.org
Rizaldy S. Tugade	Associate Administrator of Operations	zaldy.tugade@gmha.org
Rodalyn Gerardo	Deputy Assistant Administrator of Operations	rodalyn.gerardo@gmha.org

Stakeholder Attendee List		
Name (First and Last)	Position	Contact Information
Guam Power Authority (GPA)		
John Benavente	General Manager	Not provided
John Kim	Chief Financial Advisor	Jjekim@gpagwa.com (671) 648-3170
Irwin Loyola	Supervisor	ioloyola@gpagwa.com (671) 648-3211
Vincent Sablan	Engineer Manager	Vsablan@gpagwa.com (671) 648-3014
Jennifer Sablan	Assistant General Manager Operations	Jsablan@gpagwa.com (671) 648-3103
Department of Labor (DOL)		
Greg Massey	ALPCD Administrator	Greg.massey@dol.guam.gov
Guam Environmental Protection Agency (GEPA)		
Nicholas Rudley	Acting Administrator	Nic.rudley@epa.guam.gov
Port Authority of Guam (PAG)		
Vivian Leon	Corporate Services Manager	Vcleon@portofguam.com
Donna Lizama-Acosta	Planner	Dlacosta@portofguam.com
Pacifico Martir	Deputy Administrator	Pacificomartir@portofguam.com
Dominic Muna	Deputy General Manager	Dgmuna@portofguam.com
Transportation Management Group (TMG)		
Frank Santos	Consultant	Franks@tmggguam.net
One Guam		
Maria Lewis	One Guam Water/Wastewater	Maria.a.lewis2.civ@us.navy.mil (671) 349-2836
Victoria Zialcita	One Guam Electrical	Victoria.k.zialcita.civ@us.navy.mil (671) 349-4836
Guam Waterworks Authority (GWA)		
Miguel Bordallo	General Manager	Not provided