Economic Adjustment Committee Implementation Plan

Supporting the Preferred Alternative for the Relocation of Marine Corps Forces to Guam

FINAL

August 28, 2015

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On behalf of the twenty-two federal agencies that comprise the President's Economic Adjustment Committee (EAC), we are pleased to present this Implementation Plan for necessary adjustments in local public infrastructure to support the relocation of Marine Corps forces to the Territory of Guam.

Great care has been taken to ensure the deliberations and assessments underpinning this plan respond to the preferred alternative in the Department of Navy's 2015 "Guam and Commonwealth of the Northern Marianna Islands Military Relocation (2012 Roadmap Adjustments) Supplemental Environmental Impact Statement." The identified infrastructure projects are necessary to mitigate significant impacts across: water resources; marine biological resources; cultural resources; utilities (wastewater, potable water); sociocultural issues; and public health and safety. While each project is depicted in a schedule allowing for its completion in time to support the Department's operational requirements for the Asia-Pacific region rebalance, it is imperative the necessary planning, design, and other reviews for the construction of each to commence no later than Fiscal Year 2016 to meet the Navy's needs.

This plan was developed in close coordination with the Government of Guam, and several Federal partners contributed significantly to its completion, including the: U.S. Environmental Protection Agency, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Office of Insular Affairs, National Park Service, and the Department of the Navy. Collectively, they helped to ensure each planned project is reasonable, allocable, cost effective, and sustainable. The plan is intended to be a catalyst for carrying out these necessary projects.

The EAC remains available with technical assistance and support needed to undertake these projects to ensure a smooth transition in the coming years.

Sincerely,

John Conger
Chair
Department of Defense

Jay Williams
Co-vice Chair
Department of Commerce

Portia Wu
Co-vice Chair
Department of Labor

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Foreword

The Department of Defense's (DoD's) primary responsibility is to protect and defend the United States of America. In carrying out this responsibility, it is possible for communities, states, and territories to experience economic consequences as a result of mission growth when the need for public services and facilities are greater than the current capacities of the affected jurisdictions. Executive Order 12788, as amended, established the Defense Economic Adjustment Program (DEAP) to work with affected states and communities when their needs are beyond the capacities of DoD. The Economic Adjustment Committee (EAC), which is comprised of all federal departments and agencies, exists to assist DoD's efforts on behalf of these jurisdictions.

This interagency effort may be called on to assist a variety of local actions, including

- identifying problems of states, territories, and communities as a result of DoD actions that require Federal assistance;
- applying consistent policies, practices, and procedures in the administration of federal programs to assist DoD-affected states, territories, regions, metropolitan areas, communities, and businesses;
- assuring timely consultation and cooperation with federal, state, and local officials concerning DoD-related impacts on DoD-affected communities' problems;
- assuring coordinated interagency and intergovernmental adjustment assistance concerning DoD impact problems; and
- preparing, facilitating and implementing cost-effective strategies and action plans to coordinate interagency and intergovernmental economic adjustment efforts.

The Secretary of Defense chairs the EAC, and the Secretaries of the U.S. Department of Labor and Commerce serve as co-vice chairs. For sub-cabinet meetings, the Assistant Secretary of Defense for Energy, Installations, and Environment[1] serves as the chair, and the Assistant Secretary of Labor for Employment and Training and the Assistant Secretary of Commerce for Economic Development, respectively, have been designated as acting co-vice chairs. The director of DoD's Office of Economic Adjustment serves as the executive director, and the EAC receives staff support from the Office of Economic Adjustment.

The National Defense Authorization Act for Fiscal Year 2014 (FY2014 NDAA) directs the Secretary of Defense to convene the EAC in part to develop an implementation plan that addresses the public infrastructure requirements necessary to support the preferred alternative for the relocation of Marine Corps forces to Guam. This report fulfills parts (A) and (B) of Section 2822 of the FY2014 NDAA (Public Law 113-66).

On July 29, 2014, the then Acting Deputy Undersecretary of Defense (Installations & Environment) chaired a sub-cabinet level meeting of the EAC and directed the development of an implementation plan to support the preferred alternative for the relocation of Marine Corps forces to Guam.

[1] Effective December 19, 2014, the Deputy Undersecretary of Defense (Installations & Environment) position was re-designated, becoming the Assistant Secretary of Defense for Energy, Installations, and Environment. On that same date, the Acting Deputy Undersecretary of Defense (Installations & Environment) was designated to perform the duties of the Assistant Secretary of Defense for Energy, Installations, and Environment.

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Executive Summary

The preferred alternative identified in the Department of Navy's 2015 report, "Guam and Commonwealth of the Northern Mariana Islands Military Relocation (2012 Roadmap Adjustments) Supplemental Environmental Impact Statement (SEIS)," locates the Marine Corps cantonment area (to be called Marine Corps Base Guam), family housing area, and Live-Fire Training Range Complex in northern Guam. These elements, in combination with other previously approved Department of Defense (DoD) actions, including embark/disembark facilities at Naval Base Guam, a non-live fire training range complex, and aviation combat element facilities, constitute an operational U.S. Marine Corps (USMC)/Marine Air-Ground Task Force (MAGTF) capability in Guam that is an essential component of DoD's rebalance to the Asia-Pacific region. This operational capability is planned to be in place by January 2022.

All Economic Adjustment Committee (EAC) efforts to develop this implementation plan tier from the Navy's 2015 SEIS; specifically those SEIS resource areas of significant impact, which include water resources, marine biological resources, cultural resources, utilities (wastewater, potable water), sociocultural issues, and public health and safety. The adjustments detailed in the 2015 SEIS have significantly reduced the impacts on Guam's resources compared to the previous preferred alternative in 2010 as evaluated in the "Guam and CNMI Military Relocation - Relocating Marines from Okinawa, Visiting Aircraft Carrier Berthing, and Army Air and Missile Defense Task Force Environmental Impact Statement (EIS)." Figure 1 contrasts the 2010 plan with the revised 2015 effort, inclusive of outside-the-fence investments identified by the EAC at the respective times.

Figure 1. **2010 v. 2015 Comparison** (funding in millions of FY2016 dollars)

2010	Comparison	2015
Focus on Island-Wide: Water and Wastewater, Socioeconomic Projects, Japanese Investments	Proposed EIS/SEIS Action Impacts	Focus on Northern Guam: Water and Wastewater, Sociocultural, Public Health and Safety
79,000/33,000	EIS/SEIS Population Growth (Peak/Steady State)	10,000/7,400
$1,318	DoD "Outside-the-Fence" Investments to Mitigate Impacts (Japanese Funding Included in 2010 Figure)	$196.6 – $218.0
($1,251)	*Water and Wastewater Only Component of "Outside-the-Fence" Investments*	*($165 – $174)*

Necessary Projects to Support the Preferred Alternative

Federal assistance and investment in Guam's civilian infrastructure of between $196.6 and $218.0 million is needed to address and mitigate the unavoidable impacts attributable to the relocation of Marine Corps forces to Guam. This implementation plan presents these costs as ranges, taking into account estimate validation from an independent third party, as well as descriptions of work and schedules for the following five public infrastructure projects (funding in millions of FY2016 dollars):

1. Upgrade of the Northern District Wastewater Treatment Plant (NDWWTP): $134.3 to $139.6 million

2. Refurbishment of the interceptor sewer line in northern Guam from Andersen Air Force Base (AAFB) (and the preferred alternative location) to the NDWWTP: $28.8 to $30.6 million
3. Repair and expansion of the Northern Guam Lens Aquifer (NGLA) monitoring system: $2.2 to $3.7 million
4. Construction of a Guam Public Health Laboratory capable of Biosafety Level 2/3 analytical testing: $21.5 to $32.2 million
5. Construction of a Guam Cultural Repository: $9.8 to $11.9 million

Federal Assistance Required to Ensure Project Investments Are Completed on Time and Within Budgets

Through 2014, Guam expended or obligated $131.4 million of its local funding for civilian infrastructure to support the military buildup. The Government of Guam made this investment in the context of historic budget deficits and persistently limited debt capacity, and there are concerns about requiring Guam to expend more—particularly through debt.

Guam requires technical and financial assistance from the federal government to ensure it can complete each project; be ready to operate and maintain each project upon its completion; and ensure each project is completed and capable of supporting DoD's requirements for a January 2022 operational capability to support the rebalance to the Asia-Pacific region. Recent engagements by the U.S. Departments of Transportation, Education, and Health and Human Services underscore the importance of working closely with the Government of Guam to support program execution. Such engagements also will ensure that an efficient program of internal controls and project management is present for each project.

The Territory of Guam is incapable of sourcing and applying sufficient resources to these investments, and without federal assistance, these public infrastructure projects will not be completed. Guam currently has an extremely high debt burden of 97 percent of its total debt capacity, which fluctuates based on the outstanding debt issuances that are maturing and being repaid. Guam has no ability to leverage future revenue streams to finance these project investments, and its strained financial capacities are best represented by its use of long-term debt to pay its short-term obligations.

It may be necessary to develop a capability for Guam to manage any federal funding through a third party or management entity to provide oversight and assistance in the design, procurement, and overall execution of the identified projects. Close coordination with Guam will be necessary throughout these investments, and federal teams designated by the EAC will likely be needed throughout project execution for technical inputs, reviews, and financial monitoring.

Projects Must Commence Immediately

The five public infrastructure projects must start now. The complexities of their planning and design, including the environmental analyses required prior to being able to break ground, and factoring in the planned timeline for the relocation of Marine Corps forces, necessitate that these projects commence immediately to ensure the civilian infrastructure necessary to support the operational capability of Marine Corps forces is in place. Operational forces and families need civilian wastewater infrastructure improvements in place upon their arrival in 2019. Without federal assistance, the improvements will not be completed, and additional wastewater flow will not be permitted to the current treatment facility—the NDWWTP—which is currently noncompliant with its operating permit. Federal construction activity

on Guam is ongoing and will increase as the Marine Corps Master Plan for Guam is executed. The Guam Cultural Repository ensures a federally compliant facility will be in place to support all associated construction activity and to provide the people of Guam with a facility that will support the long-term protection and enhancement of their material culture. The development of a public health lab will provide the capability to identify public health threats to the military population as well as the civilian population. Enhanced public health laboratory capabilities need to be in place to support the current DoD population and future service members during off-Territory rotations, as this capability is not resident at Naval Hospital Guam nor in the current civilian facilities.

DoD Investment Required to Fund the Projects

To date, the funds necessary for these capital investments have not been available through other federal agencies, as they would exceed the available funding levels for many eligible programs. Furthermore, most federal agencies have neither capacity nor authority to execute mitigation projects responsive to the requirements described. Pursuant to the provisions of the National Environmental Policy Act (NEPA) and its implementing regulations, DoD is required to state whether all practicable means to mitigate the environmental impacts of the selected alternative have been adopted, or explain why not. ***Failure to mitigate identified impacts without a compelling rationale for doing so jeopardizes DoD's ability to implement the preferred alternative on the current projected timeline*.** The investments in the mitigation projects identified in this plan represent necessary federal assistance to respond to needs in specific resource areas identified as areas of "significant" impact in the 2015 SEIS. Because of DoD's role as the agency undertaking the program activity that will impact the Territory of Guam, DoD is the primary source of funding.

2014 and 2015 National Defense Authorization Acts

The National Defense Authorization Act for Fiscal Year 2014 (FY2014 NDAA) includes language that directs the Secretary of Defense to convene the EAC and to submit a report to the congressional defense committees that addresses the public infrastructure requirements necessary to support the preferred alternative, including detailed descriptions of work, costs, and schedules for completion of construction, improvements, and repairs to Guam's public infrastructure affected by the relocation of Marine Corps forces to Guam.

A formal sub-cabinet level meeting of the EAC occurred on July 29, 2014. The then-Acting Deputy Undersecretary of Defense for Installations and Environment chaired the meeting, with the Assistant Secretary of Commerce for Economic Development Administration, on behalf of the Secretary of Commerce, and the Deputy Assistant Secretary for Employment & Training Administration, on behalf of the Secretary of Labor, serving as co-vice chairs. Leaders and staff representing 22 federal departments and agencies were present. Territory of Guam Delegate to the U.S. House of Representatives, Madeleine Bordallo, and the Governor of Guam, Eddie Baza Calvo (by video address) also attended the meeting. The EAC was requested to develop an implementation plan to support the preferred alternative for the relocation of Marine Corps forces to Guam.

In response to directions from the July 2014 meeting, the EAC identified working groups that reviewed, evaluated, and validated the public infrastructure investments necessary to support the Marine Corps relocation to Guam. These interagency working groups—Water and Wastewater, Public Health and Safety, and Cultural Resources—were co-led by DoD and by the U.S. Environmental Protection Agency (U.S. EPA), the U.S. Department of Health and Human Services (HHS) and its Centers for Disease Control

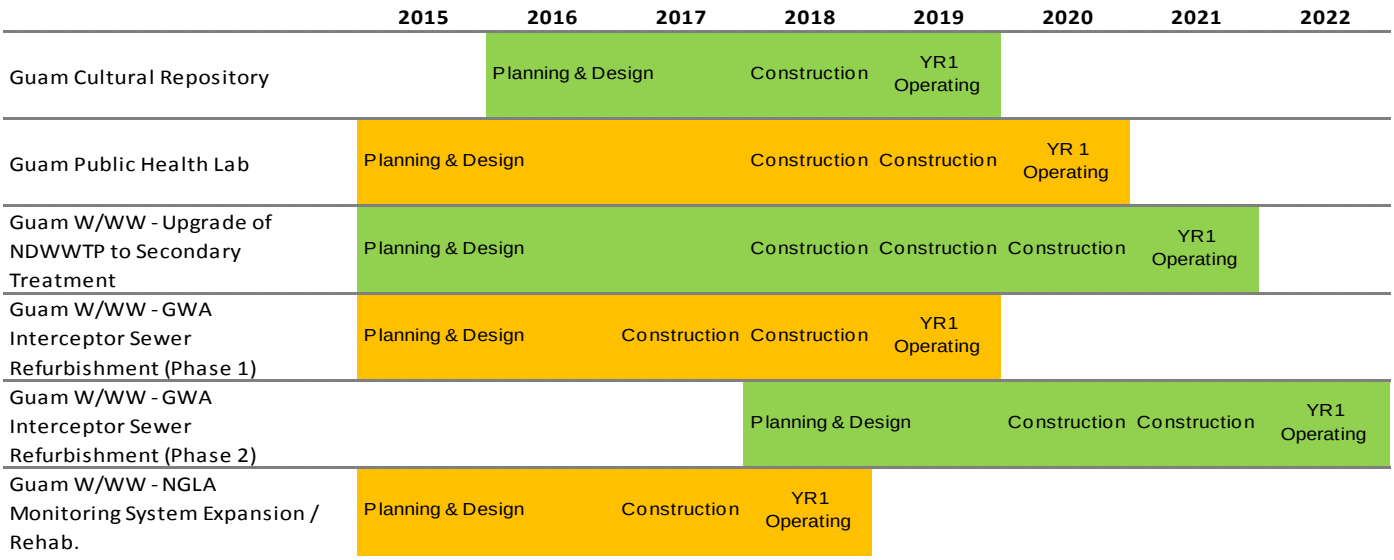
and Prevention (CDC), and the U.S. Department of the Interior's Office of Insular Affairs (OIA) with the National Park Service, respectively. These functional area experts provided the experience and subject matter expertise as the working groups looked at issues relating to reasonableness, cost, execution alternatives, and post-project sustainment.

Summary of Descriptions of Work, Costs, and Schedules

The public infrastructure projects in this plan are identified as necessary mitigation for the significant impacts identified in the Navy's 2015 SEIS. Some of the proposed federal investments in the Guam civilian infrastructure were expressed as areas of concern during the public comment periods and reviews by the public and federal agencies/departments. As a result of these discussions and coordination, the plan for federal assistance to Guam's public infrastructure was synchronized in the 2015 SEIS.

The initiation and execution of the five projects identified in this plan should commence in FY2016 to support the development and construction of the preferred alternative. Considering the known factors, Figure 2 depicts the proposed schedules for these planned projects. The investments detailed in this plan are timed to coincide with and support the expected Guam population growth associated with the preferred alternative and January 2022 when Marine Corps Base Guam is planned to be operational.

Figure 2. **Summary of Project Plan Schedules (Calendar Year)**



The sum of all investments is estimated to be between $196.6 and $218.0 million. See Figure 3 for the breakdown of these investments. All dollars are in FY2016 millions, and include escalation rates for each project (based on Office of Management and Budget guidance for the application of such rates) applied to the midpoint of the individual project plan's construction schedule. The estimates are planning level in quality, as construction-level estimates could not be prepared due to existing restrictions on the development of public infrastructure, and detailed design or planning (beyond ~10 percent) could be considered "development."

Figure 3. **Summary of Estimated Plan Costs** (all estimates in millions of FY2016 dollars)

	Appropriations[2]	Low	High
Guam Cultural Repository	12.0	9.8	11.9
Guam Public Health Lab	13.0	21.5	32.2
Upgrade of the NDWWTP to Secondary Treatment	106.4	134.3	139.6
GWA Interceptor Sewer Refurbishment (Phase 1)	-	15.3	16.3
GWA Interceptor Sewer Refurbishment (Phase 2)	-	13.5	14.3
NGLA Monitoring System Expansion/Rehabilitation	-	2.2	3.7
TOTALS	**$ 131.4**	**$ 196.6**	**$ 218.0**

Guam Capacities (Ability to Pay and Project Management)

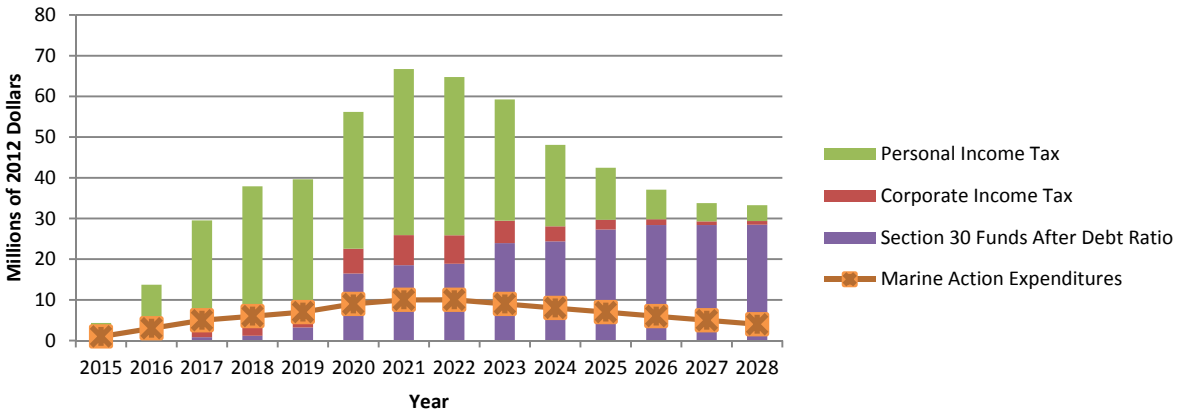
In the course of preparing project descriptions of work, costs, and schedules, the EAC considered whether Guam possessed an ability to pay for these investments or whether federal funding assistance was required to develop and implement the identified mitigation projects.

Guam currently has an extremely high debt burden that is at 97 percent of its legal debt capacity. The remaining total debt capacity, $45.17 million based on Guam's assessed land value, fluctuates based on the outstanding debt issuances that are maturing and being repaid. Guam also currently uses long-term debt revenue to pay for short-term obligations.[3] An example of this practice is the fact that 15 percent of future Section 30 revenue streams, based on the 2010 buildup levels, already have been bonded against (Guam Bond series 2009A). This practice also highlights Guam's inability to collect tax revenue. Due to persistently low collection rates, [4] the Territory has had to borrow from bond funding to pay the tax liability, exacerbating its debt burden. Due to Guam's debt capacity and tax collection issues, Guam lacks the ability to finance the public infrastructure improvements necessary to support the preferred alternative.

The 2015 SEIS projects $86.4 million in tax revenues will likely be generated by the preferred alternative during the peak construction year (2021). Guam's annual tax revenues generated after Marine Corps Base Guam's operational date are projected to increase by approximately $40 million per year. Figure 4 shows a forecast of those accrued tax revenues against the projected Guam population growth—due both to organic growth and military buildup activities.

[2] Appropriations to date: $12 million was appropriated in FY2012, and $119.4 million was appropriated in FY2014.
[3] For specific examples of this practice, please refer to the Guam Debt subsection of this plan.
[4] The Department of Interior's Office of Inspector General last issued a report in 2008 on Guam's persistent tax collection issues. At the time, persistent deficiencies in Guam's tax collection process were credited with lost tax revenues of "at least $23.5 million each year." The report also noted, "[the] problems we observed are not new, having been identified and reported on previously in a number of Office of Inspector General (OIG) reports dating back to 1989." Source: *Guam's Tax Collection Activities: Office of Insular Affairs Involvement Needed to Achieve Lasting Improvements.* Report No. HI-EV-GUA-0002-2008 (November 2008).

Figure 4. **Marine Relocation Tax Revenues by Source and Marine Relocation Expenditures Comparison** (100 percent Tax Collection Rate)[5]



Despite these projected revenue increases, it cannot be assumed that the projected revenues can be collected and made available in the Guam General Fund. Otherwise, these revenues could be allocated to support military buildup-related activities and costs.

Guam has experienced persistent issues associated with the collection of taxes and revenue. The 2015 SEIS assumes that accrued tax revenues will offset direct Guam costs incurred to address shortfalls in Guam public services. However, persistent tax and revenue collection issues, combined with fluctuations in revenue streams based on military buildup activities, may challenge the collection of these revenues. This is compounded by low levels of public service delivery that disrupt the efficient provision of some Guam public services. The combination of these variables will pose systemic challenges for Guam and will complicate Guam's ability to fund any project or public service related to the military buildup.

The allocation and prioritization process of Guam General Fund revenues against public expenditures also has been an issue. Decisions on the allocation of tax and revenue streams that accrue to the Guam General Fund follow the actions, checks, and balances represented by the executive and legislative branches of Guam's government. The process for the allocation of Guam General Fund revenue is iterative and uncertain, and the annual outcomes or priorities cannot be predetermined.

[5] Sources: *Guam and CNMI Military Relocation (2012 Roadmap Adjustments) SEIS and SIAS* and the *Government of Guam Long-Term Debt Abstract* (June 2014).
Notes:

1. Approximately 15 percent of the projected Section 30 future revenue already has been bonded against.
2. The figure assumes a tax collection rate of 100 percent as prescribed by Guam Tax and Revenue law even though actual collection rates are lower. The collection rate is applicable to personal income, corporate income, and gross receipts taxes. However, there are significant deficiencies with the tax collection on Guam. DoD has provided and will provide assistance to Guam, as appropriate, to address the deficiencies.
3. The expenditures include only professional positions and other associated costs including rent, office supplies, etc., but do not include support staff or other potentially more efficient solutions to potential labor/public service shortfalls.
4. The revenues and expenditures do not account for other existing DoD projects that also generate current revenue.

In explaining the reasons why Guam General Fund allocations are both contentious and challenging, Guam has identified a deficit in Compact Impact Aid reimbursement funding compared to the financial costs that Guam incurs resulting from increased migration under the Compacts of Free Association (COFA) Act of 1985. Guam estimated the costs of implementing the COFA in 2014 at $144.3 million.[6] Compact Impact Aid (grant) reimbursements in 2014 totaled $16.8 million—out of the $30 million available for U.S. states and territories adjusting to impacts from COFA. The deficits in Compact Impact Aid funding weaken Guam's ability to allocate increased revenue collected due to buildup activities against investments that mitigate impacts caused by the preferred alternative.

Compact Impact Aid reimbursement is a collective issue for the federal government that mostly impacts health and education. The U.S. Department of Interior's OIA administers the $30 million in mandatory funding provided by Congress to affected jurisdictions like Guam and Hawaii. Currently OIA, in partnership with the White House Intergovernmental Affairs Office, co-chairs the Federal Interagency Working Group on Compact Impact Aid composed of the U.S. Departments of Health and Human Services, Education, Labor, Housing and Urban Development, Homeland Security, State, and Defense to identify and implement short- and long-term programmatic and policy strategies to ameliorate the financial impact on Guam and other affected jurisdictions.

Guam has expended proportionally significant funding to date in anticipation of the impacts identified in the 2010 EIS. Through 2014, Guam spent $131.4 million of its own funding for civilian infrastructure in preparation for the military buildup through investments in port modernization ($17 million), solid waste disposal ($104.1 million), and water and wastewater repairs and improvements ($10.3 million). These investments were made in the context of historic budget deficits and persistently limited debt capacity.

Access to revenue bonding, as well as limited obligation bonding, also was considered in this ability-to-pay analysis. The sale of future revenue bonds presents additional risks. DoD has discussed in the past whether it may be a potential payer for higher future utility rates as a revenue stream to pay revenue bond debt service. Theoretically, this future revenue might be bonded now to pay for the preferred alternative mitigation projects. However, DoD is unable to commit to future fiscal year obligations without congressionally authorized or appropriated funding.

Implementation Plan Approach and Methodology

The content developed for this implementation plan was constrained to ensure compliance with Section 2822 of the National Defense Authorization Act for Fiscal Year 2014 (FY2014 NDAA) that restricts the use of funding where that funding *will result in the development (including repair, replacement, renovation, conversion, improvement, expansion, acquisition, or construction) of public infrastructure on Guam*. This restriction limited the underlying planning for this report to general or conceptual planning and design only.

DoD worked with the Government Accountability Office (GAO) in the development of its Report 14-82, *Further Analysis Needed to Identify Guam's Public Infrastructure Requirements and Costs for DOD's Realignment Plan*, and has incorporated the resulting recommendations to the extent practicable, given

[6] This information is from the Government of Guam's (Guam Bureau of Statistics and Plans) *2014 Impact of the Compacts of Free Association on Guam (FY 2004 to 2014)*.

the constraints on more detailed planning. This plan revalidates the public infrastructure needs on Guam based on the revised realignment size and ensures best practices are used to develop future cost estimates. For the projects contained herein, every effort was made to follow the standards set forth by the GAO for the development of budget estimates as described in the GAO's *Cost Estimating and Assessment Guide*. Moreover, independent government cost estimates (IGCEs) were completed for all plans by an independent third party. The ICGE report provides study-level estimates based on conceptual design information from other technical assessment reports. The estimates for each of the projects in the IGCE report are independent of previous cost estimating prepared by others. Several historical projects were used for comparative cost data and the application of comprehensive scope analysis. Each of these projects was normalized for location and date. A combination of estimating methods, techniques, and data sources were used in the development of the IGCE cost estimates.

The risk or potential variance in the cost estimates are discussed in each summary. As the projects progress through the design phase, some additional cost variances may occur in the course of finalizing the project execution plans, although these variations should remain within the cost ranges presented.

The projects that meet the requirements set forth by the Navy, Guam, and other federal agency stakeholders for the improvement of Guam's civilian water and wastewater infrastructure, are the furthest along in planning. The water and wastewater investment plans are consistent with an Association for the Advancement of Cost Engineering Class 4 level of planning, which is not sufficient for a final design.

The requirements guiding the development of a project plan for a Guam Cultural Repository are well understood, due in large part to the work that occurred in 2011 as part of the Programmatic Agreement. However, additional work is needed to move this plan to a final design suitable for construction contracting process.

The need for Biosafety Level 2/3 testing capability on Guam, including the construction of a Guam Public Health Laboratory, was identified in the 2015 SEIS. The requirements associated with the development of this testing capability are now defined or understood as a result of this EAC assessment.

Summary

The investment plans correspond to the significant 2015 SEIS impacts identified and are necessary mitigations to offset impacts to Guam's public infrastructure and facilities affected by the preferred alternative. Congress has appropriated $131.4 million to date. This plan estimates that not more than $86.7 million in additional appropriations will be required to execute these projects.

The Economic Adjustment Committee and Guam

The Department of Defense's (DoD's) primary responsibility is to protect and defend the United States of America. In carrying out this responsibility, it is possible for communities, states, and territories to experience economic consequences as a result of mission growth when the needs for public services and facilities are greater than the current capacities of the affected jurisdictions. Executive Order 12788, as amended, established the Defense Economic Adjustment Program (DEAP) to work with affected civilian public entities when their needs are beyond the capacities of DoD. The Economic Adjustment Committee (EAC), comprised of all federal departments and agencies, exists to assist DoD's efforts on behalf of these jurisdictions.

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The following report presents the latest EAC engagement in response to DoD's announced buildup on Guam.

On July 29, 2014, then Acting Deputy Undersecretary of Defense (Installations & Environment) chaired a sub-cabinet level meeting of the EAC and directed the development of an implementation plan to support the revised preferred alternative for the relocation of Marine Corps forces to Guam.

[7] Effective December 19, 2014, the Deputy Undersecretary of Defense (Installations & Environment) position was re-designated, becoming the Assistant Secretary of Defense for Energy, Installations, and Environment. On that same date, the Acting Deputy Undersecretary of Defense (Installations & Environment) was designated to perform the duties of the Assistant Secretary of Defense for Energy, Installations, and Environment.

2014 and 2015 National Defense Authorization Acts

The FY2014 and FY2015 National Defense Authorization Acts (FY2014/FY2015 NDAA) include several provisions related to the planned DoD relocation of Marine Corps forces from Okinawa, Japan, to Guam. Language included in the FY2014 NDAA directed the EAC to convene and to submit a report to the congressional defense committees as follows:

- Section 2822(d)(1): *CONVENING OF COMMITTEE.—Not later than 90 days after the date of the enactment of this Act, the Secretary of Defense, as the chairperson of the Economic Adjustment Committee established in Executive Order No. 127887 (10 U.S.C. 2391 note), shall convene the Economic Adjustment Committee to consider assistance, including assistance to support public infrastructure requirements, necessary to support the preferred alternative for the relocation of Marine Corps forces to Guam.*
- Section 2822(d)(2): *REPORT REQUIRED.—Not later than the date on which the Record of Decision for the relocation of Marine Corps forces to Guam associated with the ''Guam and CNMI Military Relocation (2012 Roadmap Adjustments) Supplemental Environmental Impact Statement'' is issued, the Secretary of Defense shall submit to the congressional defense committees a report—*
    - *(A) describing the results of the Economic Adjustment Committee deliberations required by paragraph (1); and*
    - *(B) containing an implementation plan to support the preferred alternative for the relocation of Marine Corps forces to Guam.*

Part (e) of Section 2822 in the FY2014 NDAA defines "public infrastructure" as, *any utility, method of transportation, item of equipment, or facility under the control of a public entity or State or local government that is used by, or constructed for the benefit of, the general public*. This plan also construes *non-military utilities, facilities, and infrastructure* (Section 2822(a)(3)) as "public infrastructure."

Guam's Ability to Pay

This section provides an overview of Guam's fiscal and economic context to support the preferred alternative. As Guam is an island (as well as a U.S. territory), particular and significant differences distinguish Guam's economic and fiscal context from that of U.S. states.

Revenue Collection

The Government of Guam's operating revenue is composed of four classifications: General Fund, Special Revenue Funds, Federal Grant-in-Aid, and Semi-Autonomous and Autonomous Agency Operating Funds. The Government of Guam's General Fund is the primary fund into which government revenue is collected. The General Fund is primarily replenished by taxes, assessed fees, and rates using authorities similar to those used by U.S. states. Of the revenue generating mechanisms that replenish the Guam General Fund, taxes generate the most revenue, significantly surpassing the contributions from non-tax revenue sources such as fees, rents, interest income, and external aid. Guam also receives rebates from U.S. income taxes paid by certain Guam residents as authorized by the Organic Act of Guam. The top-

five Guam General Fund revenue sources in 2012 were (based on Guam FY2012 data and as a percentage of total General Fund revenue):[8]

1. Personal income taxes (construction & operations) (~57.6 percent)
2. Business Privilege Tax (BPT), aka Gross Revenue Tax (GRT) revenues (a quasi-sales tax) (~32.6 percent)
3. U.S. federal government sources, including Section 30 revenues or a rebate of U.S. federal income taxes paid by nonpermanent U.S. residents residing on Guam for more than 90 days (~8.2 percent)
4. Property and corporate income taxes (<1 percent)

After General Fund revenue, Special Revenue Funds are the second largest revenue source for the Government of Guam. Special Revenue Funds are created by statute or executive order based on a dedicated source of funding (e.g., revenue/appropriation). Fund expenditures are limited to those authorized through the fund's creation. Many revenue streams from such funds are used as a source for debt service for bonds.

Guam's Debt

The Government of Guam has the authority to issue both general obligation bonds and limited obligation (i.e., revenue) bonds. Guam's debt limit is restricted by the Organic Act of Guam, which stipulates that the Government of Guam has the authority to assume general and limited obligation debt up to 10 percent of the "aggregate tax valuation" of Guam land (Guam Organic Act, 48 U.S. Code 1423a). Specifically,

> *"… no public indebtedness of Guam shall be authorized or allowed in excess of 10 per centum of the aggregate [i.e., assessed] tax valuation of the property in Guam. Bonds or other obligations of the government of Guam payable solely from revenues derived from any public improvement or undertaking shall not be considered public indebtedness of Guam within the meaning of this section."*[9]

Guam's debt ceiling may be adjusted through an act of the Guam Legislature. Since 2007, the Guam Legislature has approved a change to the definition of how the assessed valuation of Guam land is calculated three times, each time having the effect of increasing the island's borrowing capacity. In 2012, the Guam Legislature expanded Guam's borrowing capacity by redefining Guam's assessed value to 100 percent of taxable appraised value (Guam Public Law 31-196).

The total debt in Guam is not limited to its outstanding general and limited bond obligations. However, only general and limited obligation debt is subject to the Organic Act of Guam debt ceiling restrictions. Other Government of Guam debt financing sources not subject to the debt ceiling include certificates of participation, notes payables, and other loans not backed by the full faith of the general government taxes and revenues. These obligations are not issued on the pledge of governmental taxes and revenues; therefore, they are not subject to the Organic Act of Guam.

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[8] Source: Governor of Guam's *FY 2014 Executive Budget*.

[9] Source: Supreme Court of Guam (updated as of 20 September 2011), http://www.justice.gov.gu/compileroflaws/GCA/title1.html .

Debt Capacity

As of the June 2014 *Guam Economic Development Authority's Long-Term Debt Abstract*, Guam reports:[10]

- $1.113 billion outstanding debt balance subject to the Organic Act of Guam
- $2.453 billion outstanding debt balance, including autonomous agencies
- debt limit calculated to be $1.158 billion
- remaining debt capacity calculated to be approximatly $45.17 million
- Guam land property valuation assessed at $11.588 billion

Guam's actual debt capacity fluctuates based on outstanding debt issuances that are maturing and being repaid. In October 2013, Standard & Poor's upgraded Guam's General Obligation bond rating from BB- to B+, providing the following summary of Guam's current debt situation in its report[11]:

> *"The government's extremely high debt burden, which has grown significantly in recent years, and a resulting lack of financing flexibility given that the government is within $33 million (3 percent) of its $1.14 billion debt ceiling (although a large portion of debt issued in recent years has gone toward paying down other long-term liabilities such as unpaid tax refunds), [contributes to S&P's current rating]."*[12]

In addition to the Government of Guam, some Guam autonomous agencies also have bonding authority. These agencies include the Port Authority of Guam, Guam International Airport Authority, Guam Waterworks Authority (GWA), Guam Power Authority, and Guam Economic Development Authority. An additional Government of Guam-affiliated entity that has authority to securitize revenue streams to sell revenue bonds is the Guam Visitors Bureau, which is a public corporation.

Capital Improvement Finance

An important nuance to the Government of Guam's bonding authority authorizing language has to do with the nature of the expenditure financed by the bonding activity. Expenditures financed through bond proceeds that pay for a public improvement or that are revenue generating (e.g., a toll road) do not count against Guam's debt capacity. All other Government of Guam expenditures financed through bond proceeds—regardless of whether those bonds are general or limited obligation—do count against Guam's debt capacity.

[10] Sources: (1) *Government of Guam Long-Term Debt Abstract* (June 2014); (2) *Government of Guam Public Debt Performance Audit – Oct. 2007 through Sep. 2013* (OPA report No. 14-01) (April 2014).

[11] An April 2014 report from Guam's Office of Public Accountability made the following comments on this rate improvement: "The General Fund's positive fund balance of $30.1M in FY2012 was due to the issuance of debt to pay down income tax refunds and the implementation of Government Accounting Standards Board (GASB) Statement No. 54. As a result, GovGuam obtained an improved credit rating score." Source: *Government of Guam Public Debt Performance Audit – Oct. 2007 through Sep. 2013.* OPA report No. 14-01, p. 17 (April 2014).

[12] Source: *Standard & Poor's Guam GO Rating Raised To 'BB-' On Improved Financial Management* (October 16, 2013).

Guam's Economic Background

State and local U.S. economies traditionally combat rising budget deficits through a combination of cost-cutting measures and pro-growth strategies, thereby increasing revenue and decreasing costs. Guam is a small island economy with limited economic diversification to generate consistent, stable economic growth. Guam has also experienced persistent budget deficits in recent years. Deficits may be substantially correlated to the island's reliance on government spending (U.S. Federal and Territory) and spending in its tourism economy, making Guam particularly susceptible to demand changes.

Through funding provided by the U.S. Department of Interior's Office of Insular Affairs (OIA), the Bureau of Economic Analysis (BEA) publishes Gross Island Product (GIP) information detailing Guam's economic growth in terms of island output trends (i.e., gross domestic product (GDP)). The BEA GIP figures are available from 2002 to 2012 and are shown below in Figure 5.

Figure 5. **2012 Guam Gross Island Product** (in $millions)/**Growth Rate**[13]

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
$3,314	$3,435	$3,717	$4,003	$4,077	$4,207	$4,339	$4,541	$4,588	$4,555	$4,761
-	3.5%	7.6%	7.1%	1.8%	3.1%	3.0%	4.4%	1.0%	(0.7%)	4.3%

Economic performance over the 2002 to 2012 period can be correlated with disruptions in government spending and spending in tourism sectors, changes in Guam's manufacturing base (e.g., the loss of the garment industry in Saipan), and changes in fixed private investment (e.g., construction). These fluctuations have resulted in marked changes in year-over-year real GIP growth and an average GIP growth rate of 3.5 percent over the period. In contrast, over that same period, the U.S. national average real GDP growth was 3.9 percent.

Organization of and Content Included in the Implementation Plan

Two primary goals for the development and submission of this implementation plan include:

1. To coordinate the federal response in support of the Department of Navy's 2015 report, "Guam and Commonwealth of the Northern Mariana Islands Military Relocation (2012 Roadmap Adjustments) Supplemental Environmental Impact Statement (SEIS)," as well as the investments necessary to mitigate the impacts of the preferred alternative; and
2. To ensure investments required to mitigate environmental impacts can be carried out through the development of executable plans and considering existing conditions on Guam.

The EAC Implementation Plan includes three plans (five projects) to address non-military utilities, facilities, and infrastructure on Guam that will be affected by the realignment of forces using the same organization and naming conventions used in the 2015 SEIS. The content provided as part of this Implementation Plan is a summary of more extensive documentation and analyses.

The 2015 SEIS identified the following resource areas with implications for Guam's public infrastructure where a plan is included to mitigate the effects of the preferred alternative: Groundwater (including potable water), Nearshore Waters (including wastewater and marine biological resources),

[13] Source: *Bureau of Economic Analysis News Release* (December 4, 2013).

Socioeconomics and General Services (including sociocultural Issues such as the curation of cultural artifacts), and Environmental Justice and Protection of Children (including public health and safety). Three specific mitigations will require federal assistance and investments in Guam's public infrastructure due to impacts associated with the preferred alternative are:

1. Assistance in the construction of a Guam Cultural Repository for the curation of archeological collections on Guam;
2. Assistance to build a Guam Public Health Laboratory capable of biosafety level 2/3 analytical testing; and
3. Assistance to develop Guam's civilian water and wastewater infrastructure.

Using the definition provided under Part (e) of Section 2822 in the FY2014 NDAA, the content included in this implementation plan came from several sources. The sources of information about Guam's public infrastructure is the 2015 SEIS; the 2010 "Guam and CNMI Military Relocation Final Environmental Impact Statement," including the 2010 Record of Decision and the 2011 Programmatic Agreement; and the federal and public comments included in the finalization of the Environmental Impact Statements. The interagency working groups—Water and Wastewater; Public Health and Safety; and Cultural Resources—were co-led by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Health and Human Services (HHS) and its Centers for Disease Control and Prevention (CDC), the U.S. Department of the Interior's OIA with the U.S. National Park Service (NPS), respectively. These functional area experts provided the experience and subject matter expertise as the working groups looked at issues related to reasonableness, cost, execution alternatives, and post-project sustainment.

The content developed for this plan also was framed to ensure compliance with Section 2822(c) that restricts the use of funding where that funding *will result in the development (including repair, replacement, renovation, conversion, improvement, expansion, acquisition, or construction) of public infrastructure on Guam*. Accordingly, the planning and design undertaken for this report is generally at the conceptual level.

Pursuant to the provisions of the National Environmental Policy Act (NEPA) and its implementing regulations, DoD has an obligation to adopt all practicable means to mitigate the environmental consequences of the selected alternative, or explain why not. ***Failure to mitigate the identified impacts without a compelling rationale for doing so jeopardizes DoD's ability to carry out the preferred alternative on the currently projected timeline.*** The investments in the mitigation projects identified in this plan represent necessary federal assistance to respond to needs in specific resource areas identified by the Department of Navy (Navy) as areas of "significant" impact in the 2015 SEIS. Because of DoD's role as the agency undertaking the program activity that will impact the Territory, DoD is the primary source of funding.

The following plans were developed to by the EAC working groups to support the report to be transmitted by the Secretary of Defense to the congressional defense committees.

Mitigation: Improvements to Guam Civilian Water and Wastewater Systems

2015 SEIS Resource Area: Water Resources (Groundwater and Nearshore Waters), Marine Biological Resources, Utilities (Potable Water and Wastewater) [FSEIS Reference: Executive Summary; Section 4.1.2.2; Section 4.1.9.2; Section 4.1.14.2]

Programmatic Planning

Constrained planning and design efforts occurred because of existing restrictions on the development of public infrastructure (e.g., detailed design or planning beyond ~10 percent could be considered "development"), so all estimates are planning level in quality versus construction-level (shovel-ready) estimates. However, significant effort went into determining the requirements needed to support the relocation and the programmatic estimates. As a consequence, this plan represents EAC working group deliberations, planning, and programmatic level concepts that will require further work to progress to a shovel-ready project.

The EAC Water and Wastewater Working Group consisted of subject area experts from the EPA, the Guam Office of the Governor, Navy, Guam Waterworks Authority (GWA), and Guam Consolidated Commission of Utilities.

Buildup Nexus/Requirements

The potential environmental impacts on Guam's civilian water and wastewater infrastructure from the proposed military relocation are assessed in the 2015 SEIS and identified as significant. Chapter 4, Section 4.1.2.2; Section 4.1.9.2; Section 4.1.14.2, plus other places (e.g., Executive Summary, Summary of Impacts and Potential Mitigation, etc.), specify that impacts to Guam's civilian water and wastewater infrastructure will be mitigated through improvements to Guam's civilian water and wastewater infrastructure as identified in this plan. The NEPA analysis for the relocation relies on the assumption that the upgrades are implemented prior to additional demand on the Northern District Wastewater Treatment Plan (NDWWTP). Upgrades to the NDWWTP are an integral part of the natural resources mitigation for the proposed relocation, specifically the impacts to three endangered coral species, sea turtles, and essential fish habitat. The EAC Water and Wastewater Working Group identified three water and wastewater projects necessary to support the relocation of Marines Corps forces from Okinawa to Guam. Figure 6 contrasts how the requirement for mitigation of Guam's civilian water and wastewater infrastructure impacts changed between the 2010 EIS and the 2015 SEIS.

Figure 6. **2010-2015 Comparison** (all estimates in millions of FY2016 dollars)

	2010	**2015**
Number of Projects Planned	34	3
Capital Costs of Projects	$1,320	$165.3 - $173.9

Guam's civilian water and wastewater infrastructure needs extensive repair and improvements. A 2010 analysis of the necessary projects to sustain and upgrade Guam's water and wastewater system developed a conceptual need-based, 30-year GWA Capital Improvement Plan with a total cost estimate of $5.4 billion. A subsequent five-year national Guam Infrastructure Investment Plan completed in 2012 specified 65 distinct water and wastewater projects with an estimated cost of $1.32 billion. After the 2012 assessment, GWA used funding from bond issuances, a U.S. EPA state revolving fund, system

development charges, and grants ($75 million in 2014 and $103 million in 2015) for system-wide improvements to complete or advance progress on numerous repairs, replacements, and upgrades identified in the five-year national Guam Infrastructure Investment Plan.

GWA is an autonomous Guam entity with bonding authority; however, with limited debt capacity remaining. GWA utility rates have risen steadily, with additional increases anticipated. The impacts of the Marine Corps relocation preferred alternative, as assessed in the 2015 SEIS as requiring mitigation by DoD, consists of the three aforementioned projects with a total cost between $165.3 and $173.9 million.

Project 1 - Upgrade of the NDWWTP to Secondary Treatment ($134.3 to $139.6 million)
NDWWTP treats wastewater to chemically enhanced primary treatment. The Clean Water Act standard for wastewater treatment is secondary. The NDWWTP is not in compliance with its current National Pollutant Discharge Elimination System (NPDES) permit. The NDWWTP Clean Water Act waiver from secondary treatment was denied by EPA in 2011. All wastewater from the proposed Marine Corps relocation—the Marine Corps Base Guam (MCBG) main cantonment and additional family housing at Andersen Air Force Base (AAFB)—will flow to the NDWWTP. Additional wastewater flow to an already noncompliant treatment plant will have a significantly adverse impact on the environment (2015 SEIS Nearshore Waters and Marine Biological Resources) due to increased substandard effluent leaving the sewage outfall. Building a separate plant for DoD wastewater was extensively studied and found not to be cost-effective or highly viable since it would require a new permitted outfall. Cost estimates range from $179 to $191 million in FY2016 dollars for DoD-only solutions compared to upgrading the NDWWTP to secondary treatment for ~$140 million.

Project 2: GWA Interceptor Sewer Refurbishment ($28.8 to $30.6 million)
The existing interceptor sewer line from AAFB to the NDWWTP is required to provide service for the proposed Marine Corps housing at AAFB and the MCBG. The sewer line was constructed with reinforced concrete pipe and was installed in the 1990s. Recently closed circuit television footage shows substantial deterioration and pipe wall corrosion. Immediate repair is required to prevent sewer collapse and the resultant loss of wastewater sewer services, and potential leakage and contamination of the Northern Guam Lens Aquifer (NGLA).

Project 3: NGLA Monitoring System Expansion / Rehabilitation ($2.2 to $3.7 million)
The NGLA is the sole source aquifer in Guam that supports both the civilian and military populations. It is the primary source of potable water for northern Guam. The proposed Marine Corps relocation will require additional production wells to support the increased water demand. This increase in withdrawal from the NGLA will have significant localized impacts as identified in the 2015 SEIS. Inadequate oversight of the NGLA could result in poor water quality and/or quantity for all water users on Guam, both military and civilian. A comprehensive NGLA monitoring program is critical to ensure the quality of water provided to all users.

Description of Work

Project 1: Upgrade of the NDWWTP to Secondary Treatment
While the NDWWTP plant is presently in satisfactory physical and operating condition due to recent GWA rehabilitation projects, it only provides chemically enhanced primary treatment (CEPT) without disinfection. This treatment level is in violation of the NDWWTP's permit requirements and significantly impacts the quality of waters receiving effluent from the plant's outfall. Work undertaken as part of this mitigation will:

- upgrade the NDWWTP to meet its design capacity of 12 million gallons per day (MGd)
- improve the treatment level from CEPT to enhanced secondary treatment as directed in its operating permit

Major work elements to upgrade the NDWWTP from CEPT to enhanced secondary are summarized in the list below.

1. Preliminary Treatment
   1.1. Install a new grit removal system, retain the basic configuration in the headworks building and existing manual bypass coarse screen, replace the existing mechanical fine screen
   1.2. Keep chemical addition as a backup for use in meeting potential future tighter nutrient (phosphorous) removal requirements, reuse the existing primary clarifiers
2. Biological Treatment
   2.1. Construct
      2.1.1. Four new oxidation ditches
      2.1.2. Four new anoxic tanks (for nutrient removal) adjacent to and upstream of the oxidation ditches
      2.1.3. Four secondary clarifiers
      2.1.4. A process building to house the secondary sludge pumps, waste activated sludge pumps, sludge thickener, polymer feed equipment, thickened sludge (digester feed) pumps, switchgear, motor control centers, SCADA panels, and a standby generator
3. Disinfection
   3.1. Construct a new ultraviolet (UV) system
   3.2. Abandon and demolish existing chlorine contact tank
4. Effluent Disposal
   4.1. Retain existing bypass channel at the chlorine contact tank so the use of the existing connection to the ocean outfall can be maximized
   4.2. Install the fabricated and stored diffuser on the ocean outfall
5. Solids Handling
   5.1. Install a new waste activated sludge thickener
   5.2. Rehabilitate the existing two anaerobic digesters
   5.3. Construct two new anaerobic digesters, expand the current dewatering building for new centrifuges, provide additional cover for sludge removal trucks
   5.4. Install a new covered sludge drying bed for dewatering debris generated by sewer system cleaning

Project 2: GWA Interceptor Sewer Refurbishment
The wastewater service areas conveying flow to the NDWWTP can divide into two sub-basins. Wastewater generated in the north from AAFB, Naval Communications Station Finegayan, and the civilian population is conveyed through a GWA interceptor sewer that begins at AAFB and extends along

Route 9 and Route 3, then discharges directly to the NDWWTP. Wastewater generated in the southern sub-basin by civilians is conveyed to the NDWWTP through a force main from the Southern Link Sewer Pump Station. The focus area of the wastewater collection system for this project plan is the GWA interceptor sewer from AAFB to the NDWWTP. The size of the interceptor sewer varies from 18 inches to 42 inches. As previously mentioned, the entire length of the interceptor sewer from AAFB to NDWWTP requires rehabilitation or replacement to provide continuing transportation of wastewater.

The major work element to refurbish the GWA sewer interceptor—based on its condition as assessed between November 2014 and January 2015—is a cured-in-place (CIP) pipe rehabilitation process. Pipe rehabilitation uses the already-existing pipe as a form of curing. The process requires a small excavation around each manhole whereby the manhole cone is removed to gain access to the main pipeline. A flexible fiberglass felt liner bag saturated with liquid polyester, or epoxy resin, is forced through the pipe by filling the bag with water. The liner insertion process has been compared to "unrolling a sock" inside the host sewer. The water filling the liner bag also serves to press the bag tightly against the wall of the host pipe as it unrolls. The liner itself has a thick waterproof membrane in its interior to prevent the water from contacting the liquid resin during the insertion process. Finally, the water used to install the liner is heated to cure the liquid resin. Heated water is maintained within the liner for 12 to 24 hours to allow the coating to harden thoroughly. The rehabilitation lining process will reduce the inner diameter of the host pipe by approximately 10 percent; however, this loss is balanced by an improvement in pipe roughness of approximately 10 percent. Therefore, there is little if any net change in hydraulic capacity caused by rehabilitation lining.

The pipe rehabilitation needs to take place before the reinforcing steel becomes fully exposed, which would cause the host pipe to lose the majority of its structural integrity and to create a pipe surface too irregular for satisfactory installation of the rehabilitation CIP liner material. This refurbishment should be completed within next three to five years in the northern half of the sewer line that connects to AAFB and MCBG and within ten years in the southern half that connects to the NDWWTP.

Project 3: NGLA Monitoring System Expansion/Rehabilitation

According to the U.S. Geological Survey and the University of Guam/Water Environmental Research Institute of the Pacific, the existing NGLA monitoring system needs refurbishment of 12 existing monitoring wells, closure of one existing monitoring well, and installation of seven new monitoring wells.[14] Monitoring and management of the NGLA are requisite steps to ensure an adequate supply of quality potable water for all requirements on Guam, including those of DoD. The additional demands on the NGLA from the proposed military relocation will begin to increase during construction, but the majority of the increase will start in approximately 2021 when the relocated Marines start arriving on Guam.

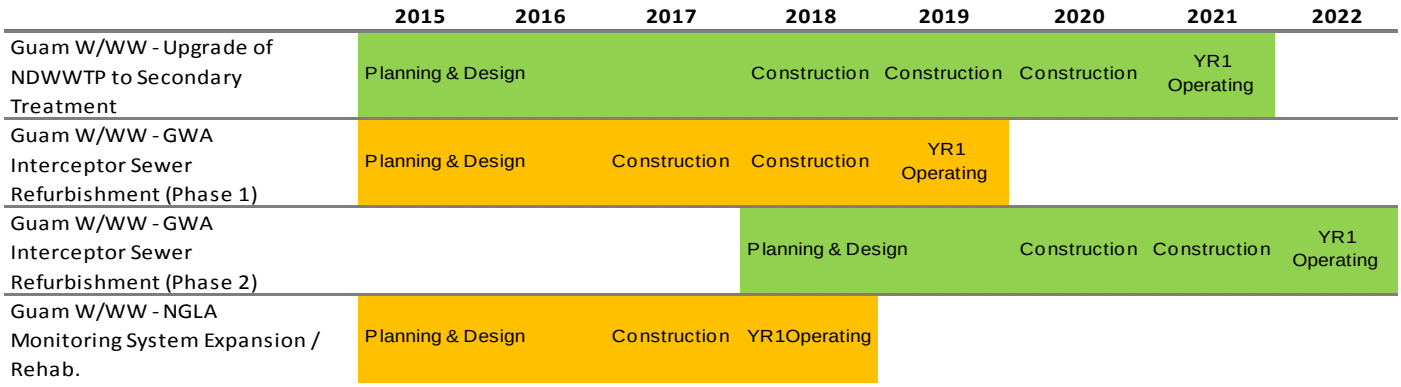
The major work elements to expand and rehabilitate the NGLA monitoring system include installation of seven new deep monitoring wells, rehabilitation of 12 existing deep monitoring wells, and abandonment and proper closure of one existing deep monitoring well.

[14] It should be noted that the seven new monitoring wells do not include the existing monitoring well that may need to be relocated due to the Route 3 road-widening project, one of the Defense Access Roads projects.

Schedule for Completion

A phased approach to these projects could be adapted to provide flexibility if required. The sewer system refurbishment could be accomplished in two phases. The third project, NGLA Monitoring System Expansion/Rehabilitation, could be split into well refurbishment and the installation of the new monitoring wells. Overall, to accommodate the date by when MCBG should be operational, specific project activities need to commence no later than the end of 2015. Figure 7 details the project schedules for each of the three mitigation projects.

Figure 7. **Anticipated Project Schedules**



Costs

Estimated capital costs of the three project areas are detailed below. All numbers are in millions of FY2016 dollars and include an average 1.1 percent escalation rate applied to obligations in years after 2016. The escalation rates apply to the midpoint of the individual project plan's construction schedule. The recommended options identified for the three wastewater and water projects have a total estimated capital cost of between approximately $165.3 and $173.9 million.

- *Project 1: Upgrade of the NDWWTP to Secondary Treatment*— ~$134.3 to $139.6 million capital cost for Option 1 and take six years and two months to complete.
- *Project 2: GWA Interceptor Sewer Refurbishment (AAFB to NDWWTP)*— ~$29 to $31 million capital cost for Option 1 and take about 3 years to complete Phase I and 2.5 years to complete Phase II.
- *Project 3: NGLA Monitoring System Expansion / Rehabilitation*— ~$2.2 to $3.7 million and take 2.5 years to complete.

Additional engineering development during the design of these projects will allow for the refinement of cost estimates. As planning for these projects proceeds, funding requirements should be periodically reviewed, and adjustments made to the program plans and execution phasing. The acquisition strategy recommended for all three projects is a design-bid-build approach.

Plan Approach and Methodology

The final water and wastewater assessment study rates a Class 4 planning level using classification standards promulgated by the Association for the Advancement of Cost Engineering, which is not sufficient for a final design. The stage of project development is planning so that the resulting cost estimates will be subject to appropriate contingencies. The following methodology and steps were used in developing the project cost estimates.

1. Define the scope of the project, including (where applicable) conceptual layouts and narrative.
2. Develop a work breakdown structure particular to the project.
3. Perform an equipment and material takeoff by work breakdown structure using various methods, including parametric.
4. Provide estimated costs for the work breakdown structure to execute the project inclusive of all identifiable costs, such as NEPA, permitting, land acquisition, design, construction management, quality assurance/quality control, record drawings, construction, operations documents, operator training, and startup. These costs were developed from available sources that include cost data from recent similar projects on Guam, vendor data, shipping costs, Guam labor rates, and other sources, such as *RSMeans Cost Estimating Guide*, parametric estimating, and professional experience.
5. Provide details of the cost buildups as backed up by the summary tables.

Post-Construction Operations and Sustainment

The Government of Guam will handle costs associated with the operations and sustainment of the facility after its first year of operations. Specific costs associated with the general operation and sustainment of the facility will include:

- full-time-equivalents (FTEs)/wastewater plant specialists trained to maintain anaerobic digestion treatment processes
- depreciation and maintenance costs for the facility and utility costs
- periodic costs associated with compliance with the plant's EPA secondary treatment permit

Mitigation: Construction of a Guam Cultural Repository

2015 SEIS Resource Area: Socioeconomics and General Services, including public services, sociocultural issues such as curation of cultural artifacts, and Cultural Resources cumulative effects [FSEIS Reference: Section 4.1.15.2; Section 7.7.10]

Programmatic Planning

Planning and design efforts were constrained by existing restrictions[15] on the development of public infrastructure (e.g., detailed design or planning beyond ~10 percent could be considered "development"), so all estimates are planning level in quality versus construction-level (shovel-ready) estimates. However, significant effort went into determining the requirements necessary to support the relocation and the programmatic estimates. As a consequence, this plan represents EAC working group deliberations, planning, and programmatic level concepts that will require further work to progress to a shovel-ready project.

The EAC Cultural Repository Working Group consisted of subject area experts from DoD, U.S. Department of Interior, U.S. National Park Service (NPS), Guam Department of Chamorro Affairs, and Guam Office of the Governor.

Buildup Nexus/Requirements

The SEIS identifies that the implementation of the preferred alternative will result in cumulative, adverse effects to historic properties, including archeological resources. The 2015 SEIS also recognizes a potential for significant sociocultural impacts from the preferred alternative.

Potential mitigation measures to resolve adverse effects to historic properties and to reduce adverse effects to cultural resources from the implementation of the preferred alternative include:

1. Conduct extensive archeological and architectural surveys and evaluations to minimize or mitigate the siting of projects on archeological and architectural properties;
2. Ensure all construction activities incorporate and are responsive to the pertinent portions of the executed 2011 Programmatic Agreement; and
3. Construct a repository for curation of archeological collections on Guam and as a source of information on Guam history and culture.

DoD committed to seeking this funding for the construction of the repository in Stipulation VII.C.4.a of the 2011 Programmatic Agreement for mitigation of cumulative effects caused by the relocation. In the 2011 Programmatic Agreement, signed by the Government of Guam and DoD, DoD commits to collaborate with Guam on the development of the repository to mitigate cumulative adverse effects. If constructed, the facility will serve as a valuable adjunct to the new Guam cultural museum, especially by providing adequate space to curate extensive Guam cultural collections, including human remains, and return to the island of Guam cultural materials removed during the island's history.

[15] Section 2822(c) of the FY2014 NDAA prohibits development of public infrastructure. Planning and/or design beyond 10 percent is considered tantamount to development.

Construction of the repository will serve to mitigate significant cultural resources and sociocultural impacts arising from the implementation of the preferred alternative by expanding Guam's ability to collect and properly store its material culture.

If federal agencies unearth cultural artifacts, they are legally obligated to curate the artifacts to ensure their condition/integrity until the artifices are accessioned in a facility compliant with Title 36 of the Code of Federal Regulations, Part 79 (36 CFR § 79). Only one 36 CFR § 79-compliant facility exists on Guam: the NPS facility at the T. Stell Newman Visitor Center, a building leased from the Navy adjacent to the main gate at Naval Base Guam. The NPS cultural repository's primary mission is to curate artifacts associated with the NPS's War in the Pacific collection; however, the NPS has accessioned Guam cultural artifacts unearthed by DoD or other federal agencies within the limited space constraints of the NPS repository. The facility does not curate human remains.[16] Guam law also prohibits the transfer of Guam cultural artifacts off-island for curation. Consistent with the 2011 Programmatic Agreement, DoD returned to Guam collections under its control previously curated and accessioned off of Guam. This was accomplished in 2012. Fiscal constraints leave Guam unable to finance the proper curation of these materials without DoD's direct investment.

The Navy projects a need to curate an additional 177 cubic feet (cu ft.) of cultural artifacts unearthed as a result of DoD's direct activities to construct the preferred alternative (DoD Artifacts). Additional curation demands are associated with the U.S. federal government's construction activity being carried out by entities other than DoD, but associated with the development of the preferred alternative, such as U.S. Federal Highway Administration (FHWA) road construction funded by Defense Access Roads (DAR) MILCON funding. Cultural artifacts are already being held by contractors that have undertaken construction projects supporting the preferred alternative that require accession into a federally compliant cultural repository. Additional projects commence will only compound this situation.

Approximately 575 cubic feet of Guam's cultural artifacts (not including human remains) under DoD's stewardship are currently curated at the T. Stell Newman Visitor Center NPS facility. The NPS will not accession human remains in the repository. Accordingly, Navy, Air Force, and FHWA are temporarily housing boxes of unearthed finds that have not been segregated (i.e., removal and identification of human remains and associated grave goods). Likewise, DoD contractors also house boxes. The Navy's Interagency Support Agreement with NPS permits approximately 675 cubic feet to be curated in total. The existing agreements do not allow artifacts unearthed by DoD contractors to be accessioned in the NPS facility. In addition, although the Navy is actively pursuing compliance with accessioning cultural artifacts into a 36 CFR § 79 (Curation of Federally Owned and Administered Archeological Collections) compliant storage facility and has brought most of the current collection into compliance, it has not achieved full compliance with the regulation. Figure 8 summarizes the existing and anticipated capacity of the collections.

[16] While human remains are not contemplated to be curated indefinitely, the Guam Cultural Repository will be required to store and maintain human remains while forensic investigations are performed and arrangements are made for re-interment.

Figure 8. **Summary of Existing and Anticipated Collections**

	Boxes (#)	**Cu ft.**	**S.F.**[17]
Existing DoD Collection (Guam-Chamorro Artifacts)	189.0	277.0	147.7
Existing DoD Collection	514.0	648.0	345.6
Existing Government of Guam Collection	4,723.0	12,135.5	6,472.3
Anticipated DoD Artifacts	118.0	177.0	94.4
Anticipated Guam Artifacts	1,355.0	2032.5	1,084.0
TOTALS	6,899.0	15,270.0	8,144.0

Based on the SEIS projections, the NPS repository does not have sufficient capacity to accession all of the unearthed cultural artifacts associated with the preferred alternative. DoD committed to seeking authorization and appropriations for a Guam Cultural Repository in the 2011 Programmatic Agreement as well as to partnering with Guam for the curation of all Guam artifacts in the Guam Cultural Repository. The construction of a Guam Cultural Repository will partially address the cumulative impact associated with the preferred alternative and provide DoD with a fully compliant facility for the curation of archeological collections.

If the Guam Cultural Repository is not authorized, DoD is required to reinitiate consultation per Section 106 of the National Historic Preservation Act (NHPA) with the parties to the 2011 Programmatic Agreement to address this aspect of mitigation of cumulative effects, potentially causing delays to all new construction activities. Furthermore, DoD will still be required to bear facility costs to ensure the curation of the artifacts and collections in accordance with federal requirements.

Description of Work

The EAC working group effort concluded that a 13,000-square-foot facility is required. The 2010 EAC assessment of requirements for the Guam Cultural Repository projected a 20,000-square-foot facility size requirement. The 2011 Programmatic Agreement accepted this facility-sizing estimate. Through the more detailed planning that occurred as part of the 2015 EAC effort, the requirements driving the estimated facility size were refined. Factors accounting for the downward refinement of the estimated facility size include the reduced size and area impacted by the preferred alternative, and the recommended use of high efficiency repository storage cabinets and devices that reduce total facility square footage by increasing the density of artifacts able to be curated per square foot. Figure 9 provides estimates for the costs associated with the Guam Cultural Repository.

Figure 9. **Guam Cultural Repository Size Estimate** (all estimates in square feet)

Shelving	3,486.0
Unboxed Artifacts	2,697.0
Administration/Circulation/Common Areas	5,000.0
Subtotal	11,183.0
Storage Growth (30 percent)	1,854.9
TOTAL	13,037.9

[17] Generally, 5 cubic feet of storage will fit in 1 square foot of space. For the purposes of this report, the following conversion was used: 1 cubic foot/1.875 = 1 square foot.

Facility requirements include shelving units for boxed curation of artifacts (~3,486 square feet); space for curation of unboxed artifacts (~2,697 square feet); administrative, curatorial, and research space (~5,000 square feet); and a 30 percent capacity for collection storage growth (~1,854 square feet). The type of artifacts and type of storage systems to be used also influence square-foot estimates. For example, a storage rack capable of holding five cubic feet of artifacts takes 1 square foot of floor space.

Facility requirements also include the operational systems necessary to maintain the integrity and security of the collections under curation. These include specific environmental controls (i.e., HVAC), and communications and physical security systems that include daytime alarms, nighttime alarms, intrusion alarms, exterior lighting, and closed-circuit televisions. Other facility systems, such as fire detection and suppression, are also required. A final site has not been selected. The Office of the Governor is working with the Guam Department of Land Management and the Guam Legislature to secure an appropriate site for the repository. Equipment will be required. Curatorial or repository storage cabinets are necessary for providing storage that is suitable for the protection and preservation of the individual artifacts as defined by the artifacts characteristics/properties. Guam's tropical climate dictates the need for repository-grade cabinetry to limit degradation from extreme humidity.

Schedule for Completion

The Guam Cultural Repository needs to be funded and constructed for the Navy to be in compliance with requirements under Section 106 of the NHPA, the 2011 Programmatic Agreement, the Archeological Resources Protection Act, and 36 CFR § 79. First and foremost, the repository will fulfill DoD's commitment to responsive mitigation to the cumulative cultural resource impacts of the relocation action and will ensure the legally compliant preservation of cultural artifacts. The execution and implementation of the 2011 Programmatic Agreement provide NHPA compliance for the relocation action and identifies specific measures to mitigate adverse effects to cultural resources, including cumulative effects arising from the relocation action. The commitment in the 2011 Programmatic Agreement to address cumulative adverse effects through the EAC recommendation to provide funding for construction of the Guam Cultural Repository was critical to successful completion of the comprehensive agreement for Section 106 compliance of the relocation and is critical to its future implementation over the life of the relocation action. Funding construction of the Guam Cultural Repository fulfills DoD's commitment to mitigate the effects of the relocation and provides the people of Guam with a facility that will support the long-term protection and enhancement of their material culture.

In addition to providing critical mitigation for NHPA compliance, the Guam Cultural Repository is the most effective way to ensure the Navy can comply with federal laws and regulations requiring the protection of archaeological collections prior to any ground being disturbed. The 2011 Programmatic Agreement defines specific protocols to protect artifacts unearthed during construction, which the Navy has accomplished to the greatest degree possible. Although the Navy is actively pursuing compliance with accessioning cultural artifacts into a 36 CFR § 79 compliant storage facility and has brought most of the collection into compliance, it has not achieved full compliance with the requirements. This is because the NPS facility does not curate archeological collections containing human remains. Among all collections on Guam, those containing human remains are the most sensitive to the Chamorro people.

This project will take 30-36 months to complete, with 6 months to develop a design-bid-build package and advertise; 3 months to award the contract; 18-months minimum construction schedule; and 3

months to equip, furnish, and commission the facility to complete the project for operations. Figure 10 details the proposed schedule. To ensure DoD remains compliant, the repository should commence as soon as possible since construction activities have already begun.

Figure 10. **Anticipated Project Schedule**

Costs

Figure 11 details cost estimates for the Guam Cultural Repository's major work elements. FY2014 NDAA, Section 2822(c) restrictions constrain cost estimates. All numbers are in millions of FY2016 dollars and include an average ~2.3 percent escalation rate applied to obligations in years after 2016. The escalation rates apply to the midpoint of the project plan construction schedule.

Figure 11 **Costs** (all estimates in FY2016 dollars)

Construction	5,841,320
SIOH/General Conditions/O&P	665,678
Equipment	954,383
Land Acquisition	-
Final Design & Planning	1,091,865
Contingency (10 percent)	701,735
Bonds	1,379,787
Taxes	510,353
Subtotal 1	11,145,120
Program Management Firm (4 percent)	394,170
Escalation Rate (FY2012 dollars to FY2017 dollars)	312,230
Year 1 Operations & Maintenance	-
TOTAL	**$ 11,851,520**

Plan Approach and Methodology

The refinement of the Guam Cultural Repository plan leveraged the 2010 EAC effort, and the EAC working group pursued the following programmatic approach.

1. The EAC working group, including Government of Guam participants from the Department of Chamorro Affairs and the Office of the Governor, reviewed the 2010 documentation, regulations, policies, manuals, and handbooks in concert with a robust engagement with the NPS curatorial staff.
2. The NPS engagement included site visits and interviews at the 36 CFR §79 certified repository at the T. Stell Newman Visitor Center NPS facility, Guam, and at the NPS Western Archeological and Conservation Center, Tucson, Arizona.
3. The cost estimates and statements of work for the Guam Cultural Repository investment plan are based on regulations and best practices available for planning, constructing, maintaining, and managing repositories charged with protecting and preserving collection artifacts. 36 CFR §79 was used to ensure the plan's adherence to federal law regarding curation of federally-

owned archeological collections. Federally owned collections include artifacts unearthed by a federal agencies/departments, inclusive of DoD, and should not be confused with specific collections, like the War in the Pacific Collection or other NPS collections associated with a National Historic Site or a National Park. The design elements critical to 36 CFR §79-compliant cultural repositories are detailed in the U.S. Department of the Interior's *Museum Property Handbook*. Two guides published by the NPS informed additional design elements: the *Museum Management Program, Conserve O Series* (1993) and the *Museum Collections, Museum Handbook, Part I* (2006).

4. Facility construction costs were estimated using two guides: DoD's *Uniform Facility Guidance (UFC) Manual*, and the *RSMeans Cost Estimating Guide*.
5. The EAC working group's Guam Cultural Repository plan was provided to Naval Facilities Engineering Command Pacific to obtain an independent third-party estimate.

The plan developed under this effort investigated several configurations of facility space and equipment to meet the space requirements for the project. Due to the specificity of the 2011 Programmatic Agreement, no alternatives to the development of a Guam Cultural Repository were considered.

Post-Construction Operations and Sustainment

The Government of Guam will be responsible for costs associated with the operations and sustainment of the facility at the conclusion of construction. The specific costs associated with the general operation and sustainment of the facility will include:

- FTEs/specialists in the curation of cultural artifacts
- depreciation and maintenance costs for the facility and utility costs
- restock of curatorial supplies and storage units
- periodic costs associated with the certification of the facility as 36 CFR §79 compliant

Mitigation: Construction of a Guam Public Health Laboratory with Biosafety Level 2/3 Testing Capability

2015 SEIS Resource Area: The SEIS highlighted Environmental Justice and Protection of Children (Socioeconomics and General Services) as the impacted resource area [FSEIS Reference: Section 4.1.18.2]]

Programmatic Planning

Existing restrictions on the development of public infrastructure (i.e., detailed design or planning beyond 10 percent could be considered "development"), constrain planning and design efforts, so all estimates are planning level in quality versus construction-level (shovel-ready) estimates. However, significant effort went into determining the requirements necessary to support the relocation and the programmatic estimates. As a consequence, this plan represents EAC working group deliberations, planning, and programmatic level concepts that will require further work to progress to a shovel-ready project.

The EAC Public Health Working Group consisted of subject area experts from DoD, HHS, CDC, Guam Department of Public Health and Social Services (DPHSS), Guam Office of the Governor, and the Association of Public Health Laboratories (APHL). The APHL team consisted of current and former directors of state public health laboratories and a design agent from an international design firm specializing in state, national, and international public health laboratories. The firm has designed 25 out of the 50 state public health laboratories and worked extensively in the CDC laboratories in Atlanta, Georgia.

Buildup Nexus/Requirements

The control or containment of many types of public health threats can be greatly enhanced by analytical testing services. Guam's role as a point of origin for foreign visitors to the United States, combined with the free migration of citizens from the Compact of Freely Associated States, increases the need for and value of the analytical testing services on Guam. Analytical testing, at a susceptible point of entry, is critical to the early detection, early warning, and early containment for the United States.

While the H-2B workforce is not as robust as the projection in the 2010 Final EIS, the H-2B workforce will still be approximately 4 percent of the island population during the construction period. After the construction period, the risk exposure is not projected to cease. The H-2B risk component is replaced by the transitory nature of the rotational Marines. While on rotational deployment to Guam, the Marines will conduct training in the area of responsibility (AOR), which will entail training in geographic areas other than Guam.

Since the number of public health and safety professionals required to maintain current levels of service at public health and safety agencies will increase by more than 2 percent, and due to existing deficiencies in facilities and equipment at these agencies, there will be short-term direct and indirect significant impacts to public health agencies during the construction period and significant direct and indirect impacts on public safety agencies during the post-construction period (steady state).

Due to insufficient staffing levels that challenge Guam's public health agencies, as well as the low-income and uninsured populations they historically serve, a population increase will further strain these extremely limited public health resources.

Working at the federal, state, and local level, public health laboratories monitor and detect health threats ranging from rabies and dengue fever to radiological contaminants, genetic disorders in newborns, and terrorist agents. Public health laboratories form the backbone of a National Laboratory Response Network (LRN) on alert 24/7 to respond to novel strains of the disease, natural disasters, chemical spills, foodborne outbreaks, and other health emergencies. Public health laboratories collaborate closely with the CDC and other federal agencies, including the U.S. EPA, the Food and Drug Administration, the Federal Bureau of Investigation, and the U.S. Department of Homeland Security. Public health laboratories also partner with the World Health Organization (WHO) and other international health entities to prevent and control health threats. For example, state public health laboratories participate in the WHO Global Influenza Surveillance Network, which monitors circulating strains of influenza to inform the selection of those to be included in the annual flu vaccine.

Based on February 2015 data from the Guam Department of Labor's Alien Labor Processing Certification Division (ALPCD), there are 1,183 H-2B workers on Guam, with 1,012 being H-2B construction workers—approximately 86 percent of all H-2B workers. The H-2B workers are approximately 24 percent of the combined U.S. and H-2B workforce (5,024). ALPCD and the Guam Contractors Association (GCA) estimate that approximately 6,000 additional H-2B construction workers will be required during Fiscal Year 2016. The demand for H-2B construction workers is directly associated with the military buildup. The reliance on H-2B construction workers is associated with three factors: a limited construction workforce on Guam; an increase of both direct military construction in support of the buildup and associated indirect construction contracts; and the high direct and opportunity costs for workers from the U.S. mainland to relocate to Guam.

The lack of biosafety Level 2/3 analytical testing and the reliance on sending test samples off island for analytical testing is undesirable since it creates a risk exposure to current island residents, both civilian and military. The increase in the island's population continued reliance on H-2B workers, and the transitory nature of the population will exacerbate the situation and increase the probabilities of an adverse public health event. Since enhanced analytical testing mitigates a risk exposure to the current population, the Guam Public Health Laboratory should be constructed and commissioned prior to the date by when Marine Corps Base Guam is operational.

Description of Work

A 35,000-square-foot facility is required to meet the primary requirements. Facility requirements will include the operational systems necessary to maintain the integrity and security of the analytical laboratories. The systems include (1) specialized environmental controls, including heating, ventilation, and air conditioning, directional air flow, a central computerized building management system, and "one-pass" ventilation through lab spaces; (2) communications systems; (3) security systems that include layered electronic access controls (e.g., proximity fob/card key system), daytime alarms, nighttime alarms, intrusion alarms, exterior lighting, and closed circuit televisions; and (4) other facility systems, such as fire detection and suppression.

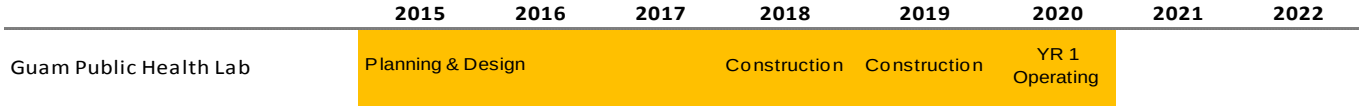
The identification of a five-acre, standalone parcel is required due to the purpose and nature of the facility, as well as the risk of exposure should a significant event occur on the island. The Office of the Governor is working with the Guam Department of Land Management and the Guam Legislature on securing the five-acre site. Special analytical equipment will be required, along with standard laboratory and office furniture and equipment.

The new Guam Public Health Laboratory is envisioned to serve as a forward-deployed regional public health laboratory that will serve as a Western Pacific hub to the LRN, a system that integrates all 50 states. The 10 U.S. Affiliated Pacific Islands (USAPI) laboratories in the surrounding jurisdictions will serve as the sentinel laboratories to the Western Pacific hub LRN and will leverage the enhanced Guam Public Health Laboratory to provide LRN confirmatory analytical testing capabilities/capacities. This function will then coordinate with the CDC national laboratories in the continental United States. The Guam Public Health Laboratory will be designed, constructed, and certified in accordance with the Federal Clinical Laboratory Improvement Amendments, which will allow certified analytical testing on Guam and eliminate the need to ship Guam and/or USAPI samples off island (thereby reducing sample shipping distances within the Western Pacific region and eliminating commercial airline transport concerns), while greatly enhancing response and detection times and containment.

Schedule for Completion

The project will take 54 months to complete, with 20 months to procure design services, plan, develop the design-bid-build package, and advertise; 4 months to award the construction contract; a 24-month construction schedule; 4 months to equip, furnish, and commission the facility for operations; and 2 months to move in. Figure 12 details the proposed schedule so as to ensure DoD compliance with the aforementioned legislation. While the schedule depicts the new Guam Public Health Laboratory being completed approximately two years ahead of MCBG being operational, it is imperative that the new Guam Public Health Laboratory be constructed and commissioned as soon as possible since the enhanced analytical testing mitigates a risk exposure to the current population, both military and civilian, and to the national public health system.

Figure 12. **Anticipated Project Schedule**



The following planning, design, and construction milestones are anticipated:

1. July 2015—Complete conceptual basis of design phase (part of the public health laboratory business case)
2. September 2015 to April 2017—Design phase (covert conceptual basis of design into construction bid documents and conduct construction solicitation)
3. August 2017—Award construction contract
4. June 2018—Midpoint of construction
5. June 2019—Construction complete
6. August 2019 to January 2020—Public health laboratory commissioning and move in

Costs

Figure 13 details cost estimates for the major work elements developing biosafety Level 2/3 testing capability on Guam. Section 2822(c) restrictions from the FY2014 NDAA constrained the cost estimates . The budget estimate, derived from the conceptual basis of design, includes a 10 percent construction contingency and an escalation rate to the midpoint of construction.

Figure 13. **Costs** (all estimates in FY2016 dollars)

Construction	10,986,126
SIOH/General Conditions/O&P	1,596,750
Equipment	3,550,000
Land Acquisition	-
Final Design & Planning	2,061,929
Contingency (10 percent)	2,129,000
Bonds	266,125
Taxes	447,090
Subtotal 1	21,037,020
Program Management Firm (4 percent)	-
Escalation Rate (2 percent FY2016 dollars to 3rd Quarter FY2018 dollars)	479,025
Year 1 Operations & Maintenance	-
TOTAL	**$ 21,516,045**

Plan Approach and Methodology

The development of biosafety Level 2/3 testing capability was not as well defined in 2010, given the complex nature of the facility and the associated analytical testing. The EAC working group pursued the following programmatic approach based on the 2015 SEIS impacts identified.

1. U.S. HHS, CDC, and APHL collaborated with Guam DPHSS and USAPI laboratories to understand the infectious/contagious diseases in the region and the local jurisdictions' analytical testing capacities/capabilities.
2. Respecting the legislative constraint, the working group developed a conceptual basis of the design that includes a conceptual building program and plan so a budget estimate could be developed.
3. APHL developed an internal APHL-associated basis of design budget estimate that totaled $15,562,990. APHL shared the basis of design, with a Guam architect, to obtain an independent third-party island-specific estimate of $16,350,000. The variance was $787,010 or approximately 5 percent.
4. The EAC working group's basis of the design was provided to Naval Facilities Engineering Command Pacific to obtain an independent third-party government estimate that totaled $32,232,073.[18]

[18] Notes:

1. The APHL budget estimate used costing data from the international design firm's extensive experience on the 25 state public health laboratories and their extensive experience with the CDC Atlanta laboratories.
2. The Guam architect used costing data from the design firm's extensive experience on Guam. The architect did not rely on national construction estimating guides or CONUS rates, which eliminated the need for an area cost factor adjustment.
3. The variance or range between the APHL budget estimate and the independent third-party government estimate can be attributed to the:
    a. Stage of the initiative—programmatic planning.
    b. Specialized nature of the building (not a common building type).

The EAC working group looked at three options:

1. *Status Quo* (no action). The current state of Guam's public health laboratory services is poor and suffers from persistent, serious staffing challenges. The testing capability has failed to provide all the necessary public health surveillance analyses, contributing to lengthy delays for test results. This option would continue to sustain, at best, the lengthy test turnaround times or more likely compound the delays. The lack of epidemiological testing would leave the regional population at risk for communicable diseases and only become a higher-risk exposure following the military buildup.
2. *Renovation of the existing DPHSS lab space*. This option describes a more comprehensive project since the project will not be limited to the laboratory. Given the age of the current DPHSS facility, it is likely that unknown or unforeseen complications will arise during the remodel process that would prove costly and almost certainly result in delays. The building, constructed in the early 1970s, would need to be brought up to current building codes and safety standards in its entirety, even though the laboratory would be a portion of the building. The laboratory is undersized and currently is located in the midst of several clinics that have exposure to patients and other customers/users of the DPHSS facility. A remodel would further be compounded due to lab services and/or patient care that would need to be relocated during construction. Functions currently housed in the DPHSS facility would need to be relocated permanently to another facility or an additional space would need to be added, which is questionable given the existing site and the age of the existing facility. Overall, it is unlikely that the existing DPHSS facility could be responsive to the testing needs.
3. *Design and construct a new dedicated laboratory facility*. This option is a less complicated project since a new standalone facility could accommodate current and future infrastructure needs, including contemporary analytical, safety, information technology, and security systems. There would be greater operational efficiencies gained by the workspace that optimizes the delivery of laboratory testing services. This option provides a facility that could conceivably serve the region's public health laboratory needs for the next 50 years. The facility would have the ability to detect novel respiratory infections including influenza and the Middle East Respiratory Syndrome (MERS), decrease foodborne illness outbreaks, save costs to the healthcare system, and protect food service. The facility also would have the potential to decrease vector-borne disease outbreaks and to provide a greater ability to track influenza outbreaks. The same impact could be expected with measles and sexually transmitted diseases.

Post-Construction Operations and Sustainment

The Government of Guam will be responsible for the costs associated with the operations and sustainment of the facility after its commissioning. The specific costs associated with the general operation and sustainment of the facility will include:

- FTEs/specialists in public health laboratory operations and analytical testing
- depreciation and maintenance costs for the facility and utility costs

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c. Tendency to over engineer or over complicate the building, especially the building systems.
d. APHL's design approach, which balances effective use and integration of systems technology with the capabilities on island to maintain and sustain the systems. The laboratory leverages technology, but is simple and not complex.

- restock of agents and supplies
- periodic costs associated with Clinical Laboratory Improvement Amendments (CLIA) certification of the facility

Successful public health laboratories typically embrace an operational management strategy called Quality Systems (QS), and WHO has published the *Laboratory Quality Management System (LQMS) Handbook* (WHO, 2011). According to LQMS, the facility is coupled with safety, and is only one of 12 Quality Systems Elements (QSE):

1. Organization
2. Personnel
3. Equipment
4. Purchasing and Inventory
5. Process Control
6. Information Management
7. Documents and Records
8. Occurrence Management
9. Assessment
10. Process Improvement
11. Customer Service
12. Facilities and Safety

The vulnerabilities in any of the QSEs can lead to a failure of the laboratory to provide the critical services. Consequently, without appropriate investment in management, staffing, logistics, training, and safety, a sophisticated laboratory can become more of a liability than an asset. In addition to general facility maintenance and operations costs (e.g., utilities), specific costs are anticipated for each of the QSE elements to operate and sustain the planned public health lab's Biosafety Level 2/3 credentials.

General Comments on the Implementation Plan Cost Estimates

To allow for comparisons across projects, the budget estimates were standardized using the same budget categories. The summary below provides information on the specific budget estimate categories included in the aggregated budget line items.

Construction—site work; roofing; flooring; plumbing; electrical; security; fire detection/suppression; interior and exterior walls; mechanical; relocation costs; signage; landscaping
SIOH/**General Conditions**/**O&P**—supervision, inspection, and overhead; overhead and profit; project-specific salaries; temporary office facilities; other temporary enclosures; sanitation facilities; drinking water; temporary utilities; indirect overhead costs
Equipment—new analytical equipment; information systems; furnishings; art and fixture installation
Land Acquisition—fee simple land acquisition costs; lease costs; easement acquisition costs
Final Design and Planning—final architectural design costs; final engineering design costs; landscape design costs; environmental planning/assessment costs
Contingency—project contingency reserves (all)
Bonds—construction bond cost; O&P bond cost
Taxes—sales taxes, as applicable (Guam has no sales tax); Guam gross receipts tax (a.k.a. business privilege tax) of 4 percent; Guam corporate income tax (variable)

Sustainability and Project Execution Considerations

While maintenance and sustainment of the projects will be the responsibility of the Government of Guam, the EAC working groups integrated sustainment as a critical component in the development of the mitigation plans. Operations and maintenance costs vary across the projects, but include staff salaries and expenses, equipment calibration, and maintenance, required proficiency training to maintain qualifications, and other such elements. The EAC working groups analyzed and incorporated design principles to reduce the complexity of maintenance and operations, thereby attempting to reduce ongoing operations and maintenance budgets. In addition, the EAC working groups deliberated on the possibility of future technical assistance from federal agencies/departments with the relevant subject area expertise (e.g., U.S. HHS and CDC for the Biosafety Level 2/3 analytical testing and public health laboratory).

The overall approach and strategy recommended for the execution of the projects is a design-bid-build approach, with the continuing support of technical advisory teams as well as an independent third party or management entity (e.g., program/construction manager) throughout the design and construction processes. The technical advisory teams will provide oversight for the procurement of the program/construction management firm, the design firm, and the construction contractor. The teams also will provide technical input during the design phases of the projects. Team membership will primarily consist of representatives from the established EAC working groups for the five projects. The procurement of an independent program/construction manager is recommended to provide day-to-day technical direction and project control.

Conclusion

The investment plans developed respond to significant impacts identified in the 2015 SEIS and are necessary to offset the Guam public infrastructure and facilities affected by the realignment of forces.

With $131.4 million appropriated to date, this plan estimates that between $65.3 and $86.7 million in additional appropriations will be required to execute these projects.

These sums factor in escalation rates, as well as contingencies anticipated in the execution of the projects. Failure to execute the planned mitigation projects increases the risk significantly to the DoD's planned buildup, and any delay in the execution of these projects puts the realignment schedule at risk. The projects identified are necessary, and planning completed to date—while requiring final design before conforming to final design and budget planning levels—is sufficient to validate the projects.

Acronyms

AAFB	Andersen Air Force Base
ALPCD	Guam Department of Labor Alien Labor Processing Center
AOR	Area of Responsibility
BEA	Bureau of Economic Analysis
BPT	Business Privilege Tax
CDC	Centers for Disease Control and Prevention
CEPT	Chemically-Enhanced Primary Treatment
CFR	U.S. Code of Federal Regulations
CIP	Cured-in-Place [Pipe]
CLIA	Federal Clinical Laboratory Improvement Amendments
CNMI	Commonwealth of Northern Marianas Islands
COFA	Compact of Free Association
CONUS	Contiguous United States
CR	Cultural Repository
CY	Calendar Year
DAR	Defense Access Roads
DEAP	Defense Economic Adjustment Program
DoD	Department of Defense
Navy	Department of Navy
DSEIS	Draft Supplemental Environmental Impact Statement
DPHSS	Department of Public Health and Social Services (Guam)
DPRI	Defense Policy Review Initiative
EAC	Economic Adjustment Committee
EIS	Environmental Impact Statement
ES	Executive Summary
FHWA	U.S. Federal Highway Administration
FTE	Full-time Equivalent
FY	Fiscal Year
GAO	U.S. Governmental Accountability Office
GDP	Gross Domestic Product
GIP	Gross Island Product
GovGuam	Government of Guam
GRT	Gross Revenue Tax
GWA	Guam Waterworks Authority
HVAC	Heating, Ventilation, and Air Conditioning
IGCE	Independent Government Cost Estimate
IOC	Initial Operating Capability
LFTRC	Live Fire Training Range Complex
LQMS	Laboratory Quality Management System
LRN	Laboratory Response Network
MAGTF	Marine Air-Ground Task Force
MCBG	Marine Corps Base Guam
MERS	Middle East Respiratory Syndrome
MGd	Million Gallons / Day
MILCON	Military Construction
NBG	Naval Base Guam

NDAA	National Defense Authorization Act
NDWWTP	Northern District Wastewater Treatment Plan
NEPA	National Environmental Protection Act
NGLA	Northern Guam Lens Aquifer
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NPS	U.S. National Park Service
O&P	Overhead and Profit
OEA	Office of Economic Adjustment
OIA	Office of Insular Affairs
PA	Programmatic Agreement
PHL	Public Health Lab
QS	Quality Systems
QSE	Quality System Elements
SEIS	Supplemental Environmental Impact Statement
SIAS	Socioeconomic Impact Assessment Study
SIOH	Supervision, Inspection and Overhead
U.S. EPA	U.S. Environmental Protection Agency
U.S. HHS	U.S. Department of Health and Human Services
U.S.C.	United States Code
USAPI	U.S. Affiliated Pacific Island Laboratories
USMC	U.S. Marine Corps
UV	Ultra Violet
WHO	World Health Organization
W/WW	Water and Wastewater