



# GUAM WATERWORKS AUTHORITY

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**Good Water Always**

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**RE: GWA Review Comments on:**

*The “Environmental Impact Statement/Overseas Environmental Impact Statement for Marine Relocation, Transient Nuclear Aircraft Carrier (CVN) Berthing, and Army Ballistic Missile Defense (BMD) Task Force”.*

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## I. GWA REVIEW EXECUTIVE SUMMARY.

Subject: Executive Summary for Guam Waterworks Authority's comments on:  
*"The "Environmental Impact Statement/Overseas Environmental Impact Statement for Marine Relocation, Transient Nuclear Aircraft Carrier (CVN) Berthing, and Army Ballistic Missile Defense (BMD) Task Force"*.

Guam Waterworks Authority (GWA) appreciates the opportunity to review the Draft Environmental Impact Statement (DEIS). Because GWA is a water and wastewater utility, GWA's review focused on identifying environmental issues related to GWA's commitment in providing superior water and wastewater services to the residents of Guam and on GWA's regulatory role in meeting other commitments.

GWA acknowledges the challenges associated with the 2014 target date the Department of Defense (DoD) has for the Marine relocation, but the challenges GWA will face because of the military build-up must also be addressed by DoD. One overarching issue is fairness; where fairness means Guam residents do not bear more than its share of the environmental, social and economical impacts. For this reason GWA strongly agrees with DoD's stated objective to avoid the creation of "two Guam's." Guam already has a disparity between the military community and the civilian community with respect to standards of living and access to services compared to other U.S. communities. Given the existing conditions of disparity on Guam, GWA's has concerns with respect to environmental justice. Specifically GWA's existing customers must not bear the negative impacts of this massive military build-up.

Despite the significant lack of information regarding collection system impacts, DoD appears to be keeping the "one Guam" goal in mind only when addressing wastewater issues. However, the failure to address impacts to water infrastructure outside of the base gates and to put the burden of construction and ancillary growth water needs fully onto GWA is clearly counter to the "one-Guam" concept. The failure to seriously discuss integrating water infrastructure into one single robust and redundant system to provide reliability for all of Guam's residents is unrealistic.

Incomplete information made it difficult to accurately identify the impacts that DoD's proposed actions will have on Guam's citizens and environmental resources. Baseline data is often absent, affecting the analysis and impacting conclusions. An example would be the site-specific assessment for groundwater which did not contain the baseline data.

GWA's review was focused on the water resource, water utility, wastewater utility and environmental justice of sections of **Volumes 1, 2, 4, 5, 6 and 7** of the DEIS.

### **Overarching Issues:**

While GWA agrees major impacts will occur in the north, GWA disagrees with DoD's subjective population distribution assumptions that the only major impacts will occur in the north. (**Volume 6-** Sections 2.2 and 2.3) The population growth due to the military build-up will affect the water supply and wastewater treatment capacity island-wide. GWA disagrees with DoD's assertion that the military's responsibility ends at the fence line, or that there will not be any wastewater impacts on Central or Southern Guam.

**Volume 6-**Sections 3.1 and 3.2 contain conflicting discussions of funding sources for off-base infrastructure improvements, and puts the entire burden of these improvements onto GWA and the Government of Guam (Gov Guam). GWA does not have the resources to prepare for the build-up growth without assistance. The suggestion by DoD that a System Development Charge funding source would allow GWA to expand to meet customer needs during the construction phase is incorrect and shows a lack of understanding of such charges. Reliance thereon would certainly result in DoD being unable to meet its planned schedules because of the time it would take to accrue adequate funding by this means.

**Recommendation 01:** The EIS must address how these impacts will be mitigated as DoD's responsibility for mitigating such impacts.

#### **Source Water:**

GWA has identified significant concerns related to Guam's federally designated sole source aquifer (SSA), as well as cause or contributions to violations of water quality standards. Additionally, the DEIS does not address how to resolve the level of uncertainty regarding the aquifer sustainable yield. The DEIS does not define sustainable yield in terms of the future cost to manage the aquifer as it approaches safe yield. For verifiable evaluation, a 3-dimensional model of the aquifer will be needed. Use of a 3-D subsurface aquifer model would help determine the effect on the aquifer of the addition water demands required by DoD for both the construction and military population growth.

**Recommendation 02:** Sustainable yield confirmation studies should occur so that additional information can be included in the EIS. The USGS study which is discussed in the DEIS, which will take 3 years to complete, is neither sufficient nor acceptable as described. Taking advantage of the body of information held by WERI and supporting its further development would provide more timely information from which good management decisions could be made in a timely manner.

**Recommendation 03:** The EIS must include a water supply and demand analysis for Guam. The water sources on Guam include groundwater and surface water. Evaluation must proceed per sub-basin for quantity and quality of water at current and future pumping rate.

**Recommendation 04:** EIS must incorporate a 3-D subsurface water model to determine the baseline condition of the aquifer. This needs to be done in collaboration with the Water Environment and Research Institute (WERI) of the University of Guam where substantial progress in this area has already been made. This may require that DoD and other federal agencies provide funding to ensure that WERI can fully and expeditiously complete and calibrate the model.

**Recommendation 05:** From the 3-D subsurface modeling data; create a financial management plan for the cost of developing the aquifer as a function of the percent of safe yield. Use this financial management model to do an environmental justice determination. The 3-D subsurface model must be maintained as the tool in the management of the aquifer.

**Recommendation 06:** The EIS must quantify the uncertainty in supply including drought condition, water quality, rainfall infiltration and construction impacts on

recharge.

In addition, where areas within the Mangilao sub-basin that are proposed for *eminent domain* acquisition for military use also contain GWA water production resources (wells) some provision for protection of these GWA resources must be made.

**Recommendation 07:** Planning to support and protect all existing GWA infrastructure must be included in the EIS.

### **Drinking Water:**

The buildup will result in an island-wide shortfall of produced water supply projected for 2013-2015 (construction phase of the buildup). This significantly impacts performance of GWA's public water system. Because the project construction workforce would reside within the GWA public water system service area, DoD assumes that GWA will make the necessary upgrades. However, GWA and Gov Guam agencies have serious financial and other resource constraints. The DEIS does not consider the potential impacts to public health and safety should the GWA water and wastewater system expansions not occur at the level sufficient to support the increased construction-phase population. The System Development Charge, which becomes effective as of March 01, 2010 will only begin accrual at that time. The proposed reliance by DoD that this funding source would allow GWA to expand to meet customer needs during the construction phase within the DoD planned time scope, is entirely incorrect. Were DoD to rely solely on this funding source as a means to support the construction phase, it would result in DoD being unable to meet its planned schedules.

**Recommendation 08:** DoD should assist in financing the development of the wells and supplemental water distribution infrastructure in order for GWA to provide water related to the construction work force in a timely manner. The long lead time to negotiate with the work force housing developer and the time to develop the wells will have a significant impact on the construction timing. If DoD intends to pay for the cost of well development via a developer reimbursement, the process above will not accrue any addition cost to DoD.

**Recommendation 09:** DoD should transfer any and all viable unused wells to GWA including the real property associated with the well sites. DoD must still provide the funding to clean up wells that are not meeting water quality standards. Specific examples are the Tumon-Maui Well, MW Series Wells, and new AAFB wells.

### **Water Infrastructure:**

GWA has identified significant concerns related to Guam's already stressed drinking water distribution infrastructure. In addition, there is uncertainty as to whether the Northern Guam Lens Aquifer (NGLA) federally designated as a Sole Source Aquifer (SSA) under the Safe Drinking Water Act, has the sustainable yield needed where desired. Contamination threats to the aquifer from point and non-point sources are also a concern, but were not analyzed in the DEIS.

**Recommendation 10:** To address source water protection, long term water quality concerns, of the SSA (NGLA); include in the mitigation plan the transfer of waste water sources currently on a septic system to sewer systems.

**Recommendation 11:** DoD should provide water at a agreed cost for any transfer of water during the construction phase. DoD should provide rate relief for the water currently (4 MGD) provided by DoD since under GWA's present rate structure as controlled by the Guam Public Utilities Commission causes GWA to sell Navy water to some customers below the cost of the water and there is no way to separate Navy water customers from other customers.

**Recommendation 12:** DoD needs to move forward with planning to integrate all water systems on Guam to provide efficient source control and provide economical, robust, reliable and redundant water supply to all water users on the island. The precedent/model to follow would be of the same type of procedure that allowed DoD to become a full power customer of GPA. This would allow DoD to discontinue its attempts to economically operate utilities.

### **Wastewater Infrastructure:**

GWA has identified significant concerns related to Guam's already stressed wastewater infrastructure. GWA does concur however with DoD's plan to upgrade the Northern District Wastewater Treatment Plant.

**Recommendation 13:** The ongoing Northern District Wastewater Treatment Plant study will identify and address impacts expected to occur during the time frame. This information should be incorporated into the final EIS for an improved project-level analysis. The EIS should also include the funding requirements needed to implement the long-term wastewater alternatives and associated actions needed to ensure long-term compliance with federal environmental laws.

**Recommendation 14:** The EIS must address impacts to the wastewater collection system, including the already stressed Central Guam collection system. Identification of impacts should include both anticipated military growth areas and ancillary impacts.

**Recommendation 15:** The EIS must address the potential for ancillary or construction growth to occur in Central and Southern Guam and the potential impacts to the Hagåtña and Southern Wastewater Treatment Plants, including at what level additional upgrades or expansion would be required to maintain environmental compliance.

### **Secondary Impacts:**

A Population distribution model should be complete to determine the impacts. Ancillary growth along the Marine Corps Drive corridor in Upper Tumon is extremely likely. This area contributes to the Hagåtña Wastewater Treatment Plant and the collection for this area is already at a stressed maximum capacity.

**Recommendations 16:** The EIS must acknowledge the potential for impacts to this system; to the Hagåtña WWTP and other locations throughout Guam. DoD should work with GWA to define solutions and funding sources for those solutions to prevent, in wet weather, sanitary sewer overflows, combined sewer overflows and improperly treated wastewater.

**Cumulative Impacts:**

The cumulative impacts of the projects are vastly underestimated. With the exception of the Northern District Waste Water Treatment Plan, the cumulative effect of this project on wastewater infrastructure and the effects on the NGLA are not present in the DEIS.

**Recommendations 17:** The EIS must assess and quantify impacts to water transmission, storage and distribution systems; to wastewater collection systems including pump stations and to the Hagåtña and Agat-Santa Rita Wastewater Treatment Plants. Mitigation and funding issues to address these impacts must be resolved.

The fact that sustainable yield will be impacted by addition of impervious surfaces (roofing, paving, etc.) has not been addressed. There are two serious concerns raised by this lack in that (1.) directing storm water directly to the ocean reduces the natural groundwater recharge, and (2.) excess freshwater runoff directly into the ocean has an immediate impact on the marine environments and no discussion of Coastal Zone Management Act (CZMA) certification of mitigated impacts has been discussed.

**Recommendations 18:** Mitigation for stormwater management needs to be addressed in terms of pretreatment and direction to recharge basins rather than diversion to the ocean. This would address both concerns by also preventing damaging uncontrolled fresh water runoff into the marine environment.

**Environmental Justice:**

The environmental justice with respect to wastewater and water service is extremely understated. One overarching issue is fairness; where fairness means Guam residents do not bear more than their share of the environmental, social and economical impacts. Guam already has a disparity between the military community and the civilian community with respect to standards of living and access to services compared to other U.S. communities. Given the existing conditions of disparity on Guam, GWA has concerns with respect to environmental justice, specifically recognizing that GWA's existing customers must not bear the excess cost impacts of this massive military build-up. One clear example of environmental justice is the increase cost in water production due to DoD's Build-up. The DEIS does not include a financial management model for the cost of developing the aquifer as a function of the percent of safe yield. The DEIS does not include the increased cost of water to the residents of Guam after the groundwater is maximized and other sources of water such as surface water must be utilized. Additionally much of cost of infrastructure due to the DoD build-up as expressed in the DEIS would fall on the current GWA rate payers. DoD did not include a financial model to determine the cost of upgrading the current system including water distribution, water production, wastewater collection, or wastewater treatment.

**Recommendation 19:** DoD must include in the EIS a financial model to determine the cost impact of upgrading the current system on the current residents of Guam. The financial model must include water distribution, water production, wastewater collection, and wastewater treatment. A detailed financial management model must be developed on sources water including the financial management model for the cost of developing the aquifer as a function of the percent of safe yield. Using data from the model, do an environmental justice determination to ensure the existing rate payers do not bear any negative impacts of this massive military build-up

**Recommendation 20:** DoD, the Joint Guam Program Office and Naval Facilities Engineering Command Pacific needs work with Guam personnel to address these issues before the Final EIS is publicly public released.

## II. GWA Comments on Utilities/Infrastructure

### II. A. General

#### 1. Off-Base Impacts to Wet Utility Infrastructure

According to the DEIS **Volume 6**-Section 3.1.2.1, capital improvements to the wet utility systems to meet the induced and construction worker populations “would be financed through surplus system revenues, grants and loans.” As DoD is well aware (through financial documents provided by GWA to DoD and its consultants), GWA does not have any “surplus system revenues”, and no source for grants has been identified. The DEIS states that “GWA has prepared a 5-year CIP for fiscal years 2009-2013.” GWA’s five year rate plan is for critical system projects, based on the GWA Water Resources Master Plan (WRMP), that are needed; irrespective of the military build-up; to satisfy regulatory and system need requirements. GWA will not have any additional borrowing capacity once these projects are financed using GWA Revenue Bonds.

**Volume 6-** Section 3.2.3 conflicts with the **Volume 6**-Section 3.1.2.1 statements by saying that the water system expansions “would be funded through collection of user fees from GWA customers. This would include user fees to be paid by contractors funded by DoD that would provide housing for construction workers.”

As DoD is aware, GWA has only recently received approval for these System Development Charges (SDC’s) by the Consolidated Commission on Utilities (CCU) and the Guam Public Utilities Commission (PUC). The fees go into effect on March 01, 2010. However, even as these fees are collected, funding will lag far behind even normal growth needs. GWA estimates of user fee accrual rates indicate that it would require approximately 20 to 50 years before GWA would have collected sufficient funds to finance the full scope of the system projects required to support military growth project populations. Thus, depending upon SDC’s to finance growth would result in inadequate funding. It will supporting only areas for single facilities rather than permit utilizing good overall system planning. The net effect would likely be delays in construction while infrastructure projects are completed which in turn could impact DoD schedules. This approach further ignores the fact that the SDC’s are subject to approval by the PUC. Further there are other projects as described in the GWA WRMP that are expected to use these fees, exclusive of projects related to the military buildup. Finally, having individual small developers pay to bring water and sewer services to individual sites may not be good for the overall system.

**Recommendations 21:** Upgrades need to be engineered in holistic fashion using full system planning for which individual developers cannot be expected to pay. These decisions will require cooperation of all agencies on Guam.

The DEIS in considering the water supply issue; has noted that DoD water could potentially be supplied to supplement construction worker usage, and for upgrading the NDWWTP for wastewater treatment. GWA will continue to actively engage in planning in these areas. However, no discussion is provided for other infrastructure, including water transmission, water storage, water boosters or water distribution. Further there is no discussion of wastewater collection and pumping, all of which will need financing for military impacted growth upgrades.

GWA does strongly concur with and supports the concept of rate relief for existing customers to shield them from the costs of growth caused by military development. However, no sources were identified for this relief in the DEIS, it merely notes that such relief is “anticipated” (Volume 6-Section 3.1.2.1) and will be “significant” (Volume 6-Section 3.2.3).

**Recommendation 22:** DoD needs to work closely with the “federal family” of agencies to define specific funding sources for the off-base impacts to GWA’s systems and for rate relief to existing customers. Such sources must be identified as soon as possible so that incoming construction workers and other induced growth do not stress existing systems and their needs can be met in a timely manner.

## 2. Land Use

### Volume 6-10.2 ENVIRONMENTAL CONSEQUENCES

#### Volume 6-10.2.6 Off Base Roadways

##### Volume 6-10.2.6.6 Summary of Impacts

“The Draft North and Central Guam Land Use Plan (GLUP) has addressed the changes in future land use as a result of the proposed Guam and CNMI military relocation project, as well as other military facility expansions over the next 20 years”

The Northern and Central Guam Land Use plan as cited in the DoD section above does not provide clear answer for land use. The following paragraph is cited from the Draft North and Central GLUP, Chapter 2 Land Use, Section 2.3. Summary of Existing Conditions – Population and Demographics, paragraph 4:

*“...Total population growth over the next 20 years is forecast at 34%. While it has not yet been determined where on Guam this growth will primarily occur, current land use plans indicate that the northern portion of the island is likely to absorb a greater proportion of this growth than the south, given the less mountainous terrain and more widespread availability of public services.”*

In addition, the following statement is also cited from the Draft North and Central GLUP Chapter 6-Transportation, Section 6.2 Goals and Policies, Goal T2, Policy T3,

*“Work with the Department of Defense and other agencies to prioritize needs and funding sources associated with future military-induced growth.”*

It is evident from these statements the Draft North and Central GLUP does not provide a definitive answer related to changes in land use as DEIS “Summary of Impacts” asserts. In addition, this statement ignores the many military personnel who reside in Central and Southern Guam, and after the buildup these numbers will undoubtedly increase thereby placing greater demands on GWA’s water and wastewater systems in these areas

**Recommendation 23:** The EIS needs to fulfill the objectives set called for by Gov Guam and DoD in the Draft North and Central GLUP. It presently does not provide a definitive answer related to changes in land use as DEIS claims.;

**Recommendation 24:** DoD must clarify and quantify population impacts off-base, both during the construction phase and after military relocation is completed. It must also

address the variability in population locations other than limiting the evaluation solely to northern Guam.

## II. B. Potable Water

### 1. Aquifer Management (Source Water)

As discussed in:

**Volume 2-3.1.1.1** Geologic Overview

**Volume 2-3.1.1.3** Geologic Units

Karst Geology

**Volume 2-4.1.1.3** Groundwater

Groundwater Availability

Groundwater Quality

Table 4.1-1. Sustainable Yield Estimates and Recent Annual Average Pumping, NGLA

**Volume 6-2.2.3.1** Water Supply Sources

**Volume 6-2.2.3.1** DoD Water Supply Sources

**Volume 6-2.2.3.2** Non-DoD Water Supply Sources

**Volume 6-2.2.5.5** Guam Water Well Testing Study

**Volume 6-2.2.5.6** Northern Guam Lens Aquifer (NGLA) GWUDI Evaluation

**Volume 7-2.3.4** Potable Water

The above referenced sections evaluate the Northern Guam Lens Aquifer (NGLA) as a single intact unit. The studies of sustainable yield which have been done have also focused on aggregate recharge for usable supply.

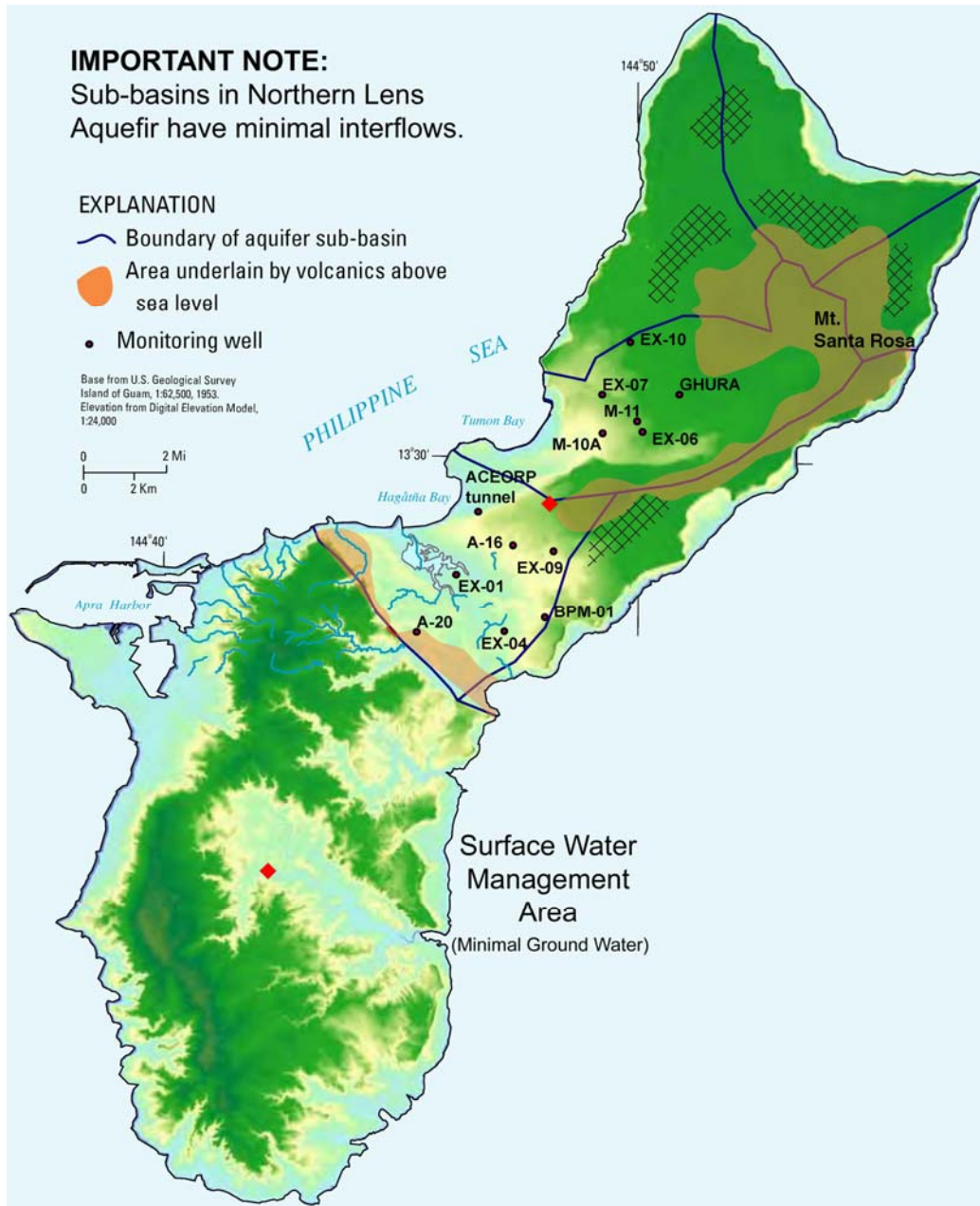
The NGLA is in fact composed of 6 sub-basins. (This excludes Southern Guam which realistically can serve mainly as a source of surface water.) [Please see “*Figure 1. Mapping the 7 water management zones of Guam*” below.] The necessity of managing the sustainable water supply on a basin by basin basis, while identified, has never been adequately quantified. The bulk of available data applies to the Yigo-Dededo Trough section through the middle and which is the largest single sub-basin.

The divisions between the sub-basins are weathered volcanics which while porous are much less permeable than the Karst limestone formations that they separate. The volcanic sub-basin partition permeability is lower by 3 to 6 orders of magnitude (1/1,000<sup>th</sup> to 1/1,000,000<sup>th</sup> of limestone permeability). This porosity difference amounts to virtual total barriers to transmission of water between sub-basins. For all the reasons described in the above referenced sections of the DEIS, it is clear that there is a need to quantify the recharge and sustainable yields for each individual sub-basin so that each can be managed individually. Even the proposed “*6-2.2.5.7 USGS NGLA Study*” does not address this need.

The University of Guam Water and Environment Research Institute (WERI) already has initial information to support the quantification of sub-basin sustainability. WERI is also drafting a true Three Dimensional Subsurface model of Guam’s groundwater.

**Recommendation 25:** Quantifying the yield on a sub-basin by sub-basin basis is critical to viable potable ground water planning before wells can be properly sited to work within sustainability limits for any given location. It may be practical to obtain good decision making information in a very short time period, especially if the “*USGS NGLA Study*” it teamed up with WERI and supports WERI’s ongoing projects studying Guam’s source waters. [See also **Recommendations 02, 04, 05 and 06** above.]

**Figure 1. Mapping the 7 water management zones of Guam.**  
 (6 subsurface water lens sub-basins and one surface water area.)



The impacts on recharge of the aquifer due to the DoD buildup projects was presented with supporting data to collected to perform quantitative analysis for water quality and water quantity. The reduction in permeability and unspecified needed increases in ponding basins exacerbates the uncertainty of the supply of the aquifer per **Volume 2-Section 4.1.1.3**. The potential increased sensitivity to contamination of the aquifer due to the recharge impacted by DoD buildup activities while noted had no quantitative mitigation strategy. **Volume 2-Section 4.2.2.1** further indicates that construction will have an impact on the aquifer recharge both in terms of water quality and water quantity without quantification or adequate mitigation addressed.

**Recommendation 26:** Recharge impacts need to be quantitatively evaluated, and remedial mitigation must serve the determined need.

**Recommendation 27:** Considerable aquifer recharge modeling has already been done by WERI and support for extending this work would significantly shorten the time it would take to reach reliable quantification of recharge impacts which in turn would allow balanced mitigation strategies.

## 2. Water Production

### Volume 6-2.2 POTABLE WATER

#### Volume 6-2.2.3 Water Supply Sources

##### Volume 6-2.2.3.2 Non-DoD Water Supply Sources

“Between the existing non-DoD water supply sources and GWA’s rehabilitation and expansion plans, there is sufficient water supply to meet the anticipated non-DoD water demand, provided that the proposed system expansion is operational in time to meet increased demand.”

**Recommendation 28:** Under present circumstances, identified system needs “anticipated” by DoD will not be operational within the targeted time frame as funding for the stated system expansion will not be available by the time needed. GWA CIP funding is subject to grants, bonds and other outside sources. DoD needs to assist GWA in accessing timely funding to construct needed infrastructure.

### Surface water.

**Volume 2-Section 4.1.5** and **Volume 6-Section 2.2.3.5** suggest the use of the Talofofu River watershed (misnamed in the DEIS as the Lost River Watershed) while partly within the Naval Magazine Reservation is not an available option for DoD development. This watershed includes the Talisay, Maemong, Bonya and Talaeyuus Streams which go underground to re-emerge in the Maagas River which meets the Mahlac River to become the Talofofu River. The Talofofu River is also fed by the Sagge, Tinechong, Sarasa and Malaja Streams.

“*The Guam Surface Water Development Study*” (Barrett Consulting Group, 1994) reserves The Talofofu watershed as an expansion source for GWA’s existing Ugum Surface Water Treatment plant. The GWA Ugum facility will need to extend a second inlet to the Talofofu River to reliably maintain supply for the treatment capacity of 4 MGD in the dry season (or during below normal rainfall conditions). A minimum flow in the Ugum River of 2 cfs (889.2 gpm or 1.3 MGD) must be maintained and the river flow in dry season can drop below the necessary 5.3 MGD needed to sustain Ugum River Surface Water Treatment Plant’s production rate. The second source inlet is engineered to access the Talofofu River (Lost River in the DEIS) just above its junction with the Ugum river. A minimum flow limitation for the Talofofu River will also be imposed, but the combination of the two sources are calculated to be sufficient to provide Ugum with its needed supply.

**Recommendation 29:** The EIS must drop the Talofofu Watershed (“Lost River” watershed) from its supply development options. This again points to the need of managing all of Guam’s water systems as a single integrated system.

## Surface Water Development.

The surface water management area of southern Guam (See “*Figure 1. Mapping the 7 water management zones of Guam.*” on page 10 above) was thoroughly studied by Barrett Consulting Group generating the 1994 report “*Guam Surface Water Development Study*”. This study provides the information that would allow GWA to maintain capacity for surface water production even through the worst drought on record in 1971-1972. In addition it provides the information necessary to manage future growth needs that can be satisfied by using surface water resources.

**Recommendation 30:** Should DoD feel that new surface water resource development is warranted, it would be to the advantage of all island residents if a cooperative project were put forward and the resources and water systems were integrated into a single operating system. In addition to the “economy of scale” business case, maintaining a fully redundant asset management program would not only maximize reliability, but would manage cost for the greatest return on investment.

## Leak detection:

In **Volume 6**-Section 3.2.3 the DEIS suggests in the Mitigation for Potential GWA Potable Water Shortfalls outside DoD Control finding additional supply via Unaccounted For Water in water loss (estimated at 50%) because of leaks. This has proven to be incorrect. The ongoing, multi-million dollar leak detection and system study, contracted by GWA, has verified that only a small portion of the “Unaccounted For Water” is a result of leaks. It has been demonstrated only 4 MGD in leaks exist in the system which is just over 10% loss by leaks. The acceleration of the leak detection program will not create this new source water. Even after a robust pipe replacement program based on the data collected by the leak detection program will the a significant amount (less the 3 MGD) of source water be recovered. GWA does not currently have funding sources for this pipe replacement program identified by GWA’s leak detection program.

It is a matter of record that the water distribution system about which DoD expresses leakage concerns is to a considerable extent a water piping system that was installed by DoD and later abandoned to Gov Guam when the military presence on island was drastically reduced.

**Recommendation 31:** It would benefit both DoD and GWA’s rate payers for DoD to accept a share of responsibility for the condition/age of the GWA distribution system and to help pay for the pipe replacement program identified by GWA’s leak detection program.

## Water Quality

**Volume 6**-Section 2.2.3.2 notes that GWA and GEPA have an ongoing well plan for chloride management in the island’s wells. In cases where the level of chlorides is increasing in GWA wells a flow rate mitigation strategy is being employed. With GEPA the well plan for the effected GWA wells includes supplementing supply from areas where chloride levels are stable or diminishing. The well plan targets GWA reduce the pumping of wells in the chloride affected well field by 2 MGD. Due to the uncertainty of weather the reduction will work to evaluate this project and collect additional data will continue.

**Recommendation 32:** DoD needs to become an active participant in the task force examining Guam’s ground water resource water quality management.

In **Volume 6**-Section 2.2.3.2, DoD assumes GWA can keep all water storage the tanks filled. This is incorrect as GWA maintain approximately 15% of its water storage with this storage reaching as high as 30% of the available storage capacity during minimum water demand periods. This situation exists because of hydraulic issues within the distribution system, pressure balanced with production capacity.

### Conservation as a Water Resource Strategy

**Recommendation 33:** Conservation is a viable method to increase the supply of water. Supply could be considerably enhanced were DoD to support a \$2M program for a civilian conservation program to replace shower heads and subsidize low flow toilet retrofits.

## 3. Water Distribution

<b>Volume 7-2.3.4</b>	Potable Water
<b>Volume 7-2.3.4.2</b>	Projecting Tipping Point(s) and Action Point(s)
<b>Volume 7-2.3.4.3</b>	Potential Impacts and Mitigation

### Mitigation Alternatives

**Volume 6**-Section 3.2.3 describes mitigation measures for the eventuality that GWA’s water supply cannot keep up with the off-base growth caused by the build-up. This is a likely scenario since the DEIS does not identify viable funding sources to support GWA expand to meet the demand.

The mitigation measure defined is for GWA to purchase more water from DoD increasing GWA’s losses associated with selling over priced water supplied by the Navy to our customers whose rates are set by the PUC. There is no proactive effort described on DoD’s part to mitigate the situation, and the DEIS provides numerous potential obstacles to this. The obstacles described are not alleviated by any offsets, alternatives or mitigations. Obstacles include a requirement for GWA to pay and contract for connections to the DoD system, however, no funding sources are identified. Such connections may not directly support a contractor’s development and therefore it may not be possible for GWA to require contractors to pay for such work.

Should there be a water shortage due to work supporting the military projects, GWA would be need to place a moratorium on new connections to the water system until additional source could be developed since GWA’s governing rules require that service limits must be observed. This would have a significant impact on the timing of the build-up work and on supporting economic development

**Volume 7**-Section 2.3.4 further discusses mitigation measures, including those it describes as “beyond DoD control” such as accelerated off-base well construction and leak detection, leak repair and line replacement. However, DoD could assist with coordination and funding efforts. This means that these measures are clearly not beyond DoD control. DoD could certainly import water or set up small desalinization plants to assist with the shortages, so these measures are certainly within their purview and capacity for mitigation or management.

The methodology discussed in the above referenced sections does not adequately address the most effective means of providing reliable water delivery for both military (off base family) needs as well as those of the civilian residents of the island of Guam. Inadequate attention has been given to the robustness, reliability and redundancy that would result from integrating all water systems on the island into a single functional utility.

A single system would fully share and properly manage the water sources available in this limited environment. Further it would take advantage of the ability to manage distribution without having to utilize distant sources when adequate supply are already available wherever needed.

**Recommendation 34:** The EIS needs to include proactive measures on the part of DoD to address off-base water shortages. Include procedures, funding sources and methods of addressing obstacles such as advance planning to replace DoD water lines in aged, poor condition.

**Recommendation 35:** The potable water distribution system will only achieve the needed, economy, reliability, robustness and redundancy that is desired by all water users when it is operated as a single system. Planning for this needs to be included in mitigation objectives.

Table ES-3. Summary of Parcels for Each Main Cantonment Alternative, Executive Summary Page ES-10 cites areas within the Mangilao sub-basin that are proposed for *eminent domain* acquisition for military use. Some of these locations also contain GWA water production resources (wells). Provision for protection of these GWA resources must be made.

**Recommendation 36:** Planning to protect all existing GWA infrastructure must be included in the EIS.

## II. C. Wastewater

### 1. Wastewater Flows

**Volume 6-**Section 2.3.3 defines the projected wastewater flows from transient personnel and off-base civilian workers as 35 gpcd. The reference for this data is UFC 3-240-02N. Section 3.3.2.2 of this UFC states that 35 gpcd is to be used for “non-resident populations.” “Non-resident” includes

- a) Non-resident military, calculated by subtracting the resident military from the total military strength
- b) Civilian personnel under Civil Service or non-appropriated funds (NAF)
- c) Personnel from other services, foreign military, or nonmilitary tenant organizations
- d) Contractor personnel (for example, base maintenance and custodial)
- e) Daytime schools
- f) Daytime transients

However, in the case of the build-up, the “non-residents” of the base will still be residents of Guam contributing fully to the plant loading, and therefore must be included as “residents.” This will significantly modify the loading unless these people were counted elsewhere in the off-base population calculations, but it is not clear that they were.

**Volume 9**-Appendix K, “Wastewater Supplementary Analysis Letter Report” states that Navy transient personnel will be living on ships and not fully contributing to the daily flows. However, they are counted as Northern District flows, and there are up to 2,000 “transient” Marines identified. This needs to be clarified. The impacts of persons on “shore leave” from berthed vessels needs to be included as well.

**Recommendation 37:** Clarify the definition of transient in the context of the DEIS and justify the use of 35 gpcd for civilian base workers or correct it to the typical 120 gpcd for residents.

## 2. Wastewater Collection

**Volume 6**-Section 3.1.3 describes the wastewater collection systems on island, including their limitations however, **Volume 6**-Section 3.2.4 does not describe any collection system impacts. Except for noting that a new gravity sewer will be built from the Marine base to the NDWWTP, there are no impacts defined to any other gravity sewer lines, pump stations or force mains, despite the amount of growth that will occur off base.

The *Wastewater Utility Study* in **Volume 9**-Appendix K documents only collection system improvements to directly support the bases. **Volume 9**-Appendix K-Section 7.2 of the study does propose a new sewer interceptor from AAFB to NDWWTP, but does not include any off-base connections.

**Recommendation 38:** The EIS must address impacts to the wastewater collection system. Its failure to identify issues and mitigations measures will result in sanitary sewer overflows leading to significant health and environmental problems. The EIS should assume that DoD will build a new collection line from Anderson AFB to the Northern District Treatment plant as discussed in DoD’s alternative. DoD may want complete the study of the Route 3 gravity line and include the recommendations of the study. Review impacts and mitigation of those impacts to other areas of the collection system, particularly the already stressed sewer system along Marine Corps Drive (described in **Volume 6**-3.1.3).

## 3. Alternatives 3 and 8

**Volume 9**-Appendix K, “Wastewater Supplementary Analysis Letter Report” states that for Alternatives 3 and 8 the preferred wastewater treatment option is to pump the additional flows to the NDWWTP. However, the referenced *Barrigada Utility Study Report* is not provided and therefore there is no flow data or other justification for this option presented, nor any mitigation measures for the ancillary impacts of these alternatives (e.g. additional civilian growth along the back road to Anderson to support the bases) and impacts to GWA’s collection system and Hagåtña WWTP.

**Recommendation 39:** Provide the Barrigada Study and the basis and justification for the option chosen, as well as all potential impacts and mitigation for that option. Provide details for and environmental impacts of a force main from Barrigada to Tanguesson, as well as full discussion of collection system impacts (the map shows the force main discharging to existing gravity system).

#### 4. NDWWTP Upgrades

**Volume 9-**Appendix K's population sand chart shows a peak construction flow above the maximum capacity of the NDWWTP. The DEIS states that this will be addressed by chemical treatment. Chemical treatment is a highly variable process dependent on dynamic conditions and requires intense evaluation in order to succeed. There is nothing in any of the studies or the DEIS to define what process or processes might be used or to demonstrate that any chemical process would be effective in meeting the NPDES permit limits at the peak flows.

**Volume 6-3.2.4.1** describes the preferred alternative as upgrading the NDWWTP. GWA would concur in principle if the flow volumes can be better defined but **Volume 9-**Appendix K's utility studies discusses flow proportioned cost apportionment. GWA has not programmed to upgrade this plant to secondary treatment in the 20 year planning horizon and has numerous other CIP needs that will drive bond acquisition and expenditures in the foreseeable future. Moving ND to secondary in the timelines discussed and asking GWA to pay a flow proportioned percentage of the costs would definitely place a burden on existing ratepayers, and would drive residential sewer fees above USEPA defined affordability levels.

**Recommendation 40:** Reassess and review cost apportionment and funding sources to ensure that GWA's existing ratepayers are not impacted by the through buildup generated increased costs or deferment of other critical projects to meet buildup schedules. Insure that the defined affordability criteria are met.

#### 5. Outfalls

**Volume 6-3.2.4.1** states that the ND outfall is adequate to support the buildup, however does not note that the Naval Facilities Engineering Command's *Northern District Wastewater Treatment Plant Outfall Assessment*, February 2009 states that the outfall's diffuser is not adequate to support the increased flows. The DEIS does not discuss the need to assess and install a diffuser in order for the outfall to meet anticipated discharge requirements.

**Volume 6-13.2.4.1** No explanation is provided for why a dilution factor of 300 is used instead of the 200 for which the outfall was designed.

**Volume 6-**Section 3.2.5.8 states that "The ocean outfall for the Hagåtña WWTP does not have a diffuser installed and is in a heavily populated area of Guam". The Hagåtña WWTP has a newly installed ocean outfall with a diffuser system and the effluent discharges in a relatively remote area of the island."

There are numerous factual errors in this statement. The two outfalls were installed at the same time; the Hagåtña outfall went on line one month before the NDWWTP outfall. The Hagåtña outfall does not have an elaborate diffuser because diffusion modeling determined that it was unnecessary for mixing. The discharge is 270 feet deep. Because the NDWWTP outfall is much shallower (140 feet deep) diffusion is necessary. Although the NDWWTP outfall was designed to include a and a diffuser and one was constructed as a part of the outfall project, it was not installed. Realistic data on military growth generated additional flows; will require a different design from the one that was constructed. Regardless of the outfall used, modeling using accurately projected flows will be required in order to determine the resultant mixing and/or diffusion needs.

**Recommendations 41:** Complete diffusion modeling for any EIS retained alternatives to design the configuration that would be required for a diffuser.

**Recommendations 42:** Modify the DEIS to correct to use correct information.

**Recommendations 43:** Revamp and reconsider the options for discharging to Hagåtña WWTP based upon the fact that impacts at either outfall would be the same.

## 6. 301(h) waivers

In several cases throughout the DEIS, including **Volume 6-Section 3.1.3**, DoD notes that EPA has denied GWA's request for continued 301(h) waivers of secondary treatment for the Northern District and Agana Wastewater Treatment Plants. While correct, the DEIS fails to note that GWA has appealed this decision and EPA's Environmental Review Board has yet to issue a decision on the appeal.

Even if ultimately GWA and EPA agree to move to secondary treatment, EPA has concurred that a long time line balance with affordability factors and other system priorities would be developed. It is the rapid increase of inflows caused by the build-up that require consideration of a potential immediate change to secondary treatment. Therefore the short term cost impacts of secondary treatment must be considered in the DEIS as being required solely by DoD activities.

**Recommendation 44:** Revise the DEIS to consider GWA's appeal or the waiver denial. Eliminate the erroneous presumption that secondary treatment will be necessary with or without the build-up and address this as a direct DoD caused impact on GWA which must not be allowed to impact GWA's ratepayers. Further, secondary treatment on a flow proportioned basis would drive sewer bills over the EPA utility affordability threshold of 2-3% of household income.

## 7. Mitigation alternatives Volume 6-Section 3.2.4.1

This section includes Potential Mitigation Measures "outside of DoD control." GWA disagrees that these measures are outside of DoD control.

**Recommendation 45:** The DEIS must be modified to address these cases. Example concerns with the proposed mitigation measures follow.

Mitigation 1. "Addition of chemical coagulants":

- There is not validation in the DEIS of the ability of chemical processing to improve performance of wastewater process performance.
- There is no discussion in the DEIS of how the addition of chemical coagulants would impact biosolids production, quantities and disposal costs.
- There is no justification in the DEIS to demonstrate that addition of chemical coagulants can provide the additional 0.8 MGD of treatment capacity as claimed in the DEIS.
- No valid testing, of any kind, that would identify chemical type, quantity, or O&M expenses for manpower and chemicals has never been done to support this concept.

**Recommendation 46:** This issue would need to be thoroughly assessed by DoD to obtain verifiable data if they choose to consider chemical processing as a viable option.

The mitigation by chemical addition requires time dependent, site specific evaluation and precise performance definition.

Mitigation 2. “Collection system upgraded and inspected to minimize inflow and infiltration (I&I)”:

- The DEIS does not provide any data to demonstrate if or how much I&I is a problem and how much capacity would be improved by its control.
- The DEIS does not provide any data on what the cost for and impacts of such work would be nor a cost/benefit ratio.

**Recommendation 47:** This issue requires DoD to execute an I&I survey; the associated system rehabilitation it might indicate and determine its cost and cost/benefit value.

Mitigation 4 Workforce housing in a different watershed; “Gov Guam could manage this through their permitting process”

- This might mitigate flows to the NDWWTP, but in so doing would generate impacts at the other plants that are not defined or considered.
- There would also be impacts (to roads and the environment) from continuous moving of personnel from such residential areas to the northern work areas and back.
- Gov Guam does not control land use beyond zoning and therefore any contractor may choose to house his workers on any appropriately zoned piece of property which they own or lease.
- GWA can specify infrastructure upgrades that may be needed to develop and use a specific piece of property in any given manner, but cannot control area(s) where the desired use might be located.

**Recommendation 48:** This measure could be within DoD control if it chooses to define where their contractors may house workers as a specification in their contracts.

## 8. Aquifer Impacts

### *Stormwater Runoff*

GWA has two concerns regarding this issue. The amount of additional impervious surface that is generated will impact rainfall permeation into the aquifer, reducing aquifer recharge. The DEIS addresses this in **Volume 2**-Section 4.2.1.1 and includes best management practices for both ensuring that the aquifer is recharged with stormwater runoff, and that the runoff is treated. The DEIS notes in **Volume 2**-Section 4.1.1.3 that stormwater runoff is a potential source of pollution to the NGLA and references two ongoing studies for more site specific controls.

GWA applauds DoD’s stated intention to use Low Impact Development methods and enhancement of recharge. The controls discussed in the DEIS and the plans for moving forward are good as far as they go, but the site specific work for the alternatives must be completed and reviewed for individual projects and for overall impacts of development, impervious surface and stormwater runoff/first flush pollution impacts on the NGLA.

**Recommendation 49:** The two studies referenced in the DEIS must be completed before an evaluation of the impacts of alternatives can be validated. The studies must address cumulative and site specific impacts to the NGLA from increase impervious surface and stormwater runoff pollutants in more detail than the generic lists of BMP’s provided in the DEIS.

*Septic Systems*

The NGLA already has a large number of septic systems located over it. The GWA WRMP identified septic systems as a significant potential source of pollution to the northern aquifer as Guam's population in the north grows if sewers are not extended. This may require additional treatment systems to put in place. Alternatively contemporary individual/small group wastewater may need to be used to replace conventional septic systems now in use. The DEIS acknowledges the threat septic systems pose to the NGLA in **Volume 2**-Section 4.1.1.3, and in **Volume 6** documents GWA's WRMP plans to sewer areas in the north.

The build-up will cause rapid growth in the north, including growth in presently unsewered areas, which will increase the risk of contamination to the aquifer by inadequately managed conventional wastewater systems. GWA does not presently have resources to extend sewers to unsewered areas at the rate that growth will proceed according to the DEIS. Nowhere does the DEIS discuss the impacts on the NGLA from this potentially increased amount of poorly managed waste from intense development. The DEIS does not offer any mitigation for the increased use of such systems in the north.

**Recommendations 50:** The EIS must address impacts that would be caused by installing additional septic systems and provide mitigation measures to protect the NGLA from the increased potential pollutant loading generated by those systems. This could include providing funding and resources for additional sewerage or other more advanced on-site treatment alternatives.