GUAM WATERWORKS AUTHORITY

Good Water Always
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July 1, 2014

Office of the Governor of Guam
Attention: Military Buildup Office (Mark Calvo)
Ricardo J. Bordallo Governor's Complex
Adelup, GU 96910

RE: GWA Review Comments on:
"The Draft Supplemental Environmental Impact Statement (DSEIS) for the Guam and CNMI Military Relocation; (2012 Roadmap Adjustment)".

Guam Waterworks Authority (GWA) appreciates the opportunity to review the Draft Supplemental Environmental Impact Statement (DSEIS).

GWA concurs that there is adequate source water in the aquifer to support the current buildup plan. However, to meet induced growth, GWA will require assistance.

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 efforts of DoD in responding to our previous review submission of the Final Environmental Impact Statement (FEIS) of 2010 which includes the following:

- Signing a memorandum of understanding on July 16, 2010 establishing objectives and a framework for further discussions regarding solutions to address increased wastewater and potable water requirements under the proposed buildup.
- Funding USGS to conduct a groundwater availability study that would provide information and tools to more effectively manage Guam's groundwater resources, and
- Assisting GWA in locating funding from federal agencies such as the DoD Office of Economic Adjustment, the DOI, and others to complete necessary upgrades which included being able to appropriate $106,400,000 for civilian water and wastewater improvements on Guam under the FY2014 Consolidated Appropriations Act (Public Law No. 113-76)

  New Comment and Recommendation 1: in the July 16, 2010 Memorandum of Understanding between DoD and GWA **[**Herewith incorporated by reference**: *"7 16 10_GWA_DOD MOU_OFFICIAL SIGNED COPY.pdf"*];** the Senior Advisory Group (SAG) and Working Group (WG) identified under LONG TERM AQUIFER MANAGEMENT in Section VI Page 6 which were defined there, need to be fully implemented. (No action on these groups has been taken to date.) Adequate management of the aquifer and island infrastructure will not occur without the full intended activities of these required groups being fully implemented and be completely

active as intended.

It appears that the SEIS needs additional work to fully address impacts to water and wastewater infrastructure on induced growth. We suggest some of the comments of February 12, 2010 remain applicable. [Previously Submitted Comments are Incorporated by reference. Incorporated commendations are from, ***"GWA-DEISComments-JGPO.pdf", dated 02/12/2010,*** and are listed/quoted by number.]

GWA's review has focused mainly (but not solely) on the water and wastewater resources in Chapter 4 of the DSEIS.

One critical defect in the DSEIS is the repeated reference to the NGLA formerly being considered to be "Ground Water Under the Direct Influence of Surface Water" (GWUDISW). [E. g., §4.1.2, Page 4-9 and Page 4-107] These references fail to recognize the December 18, 2013 GEPA Formal Declaration Letter giving the final declaration that the NGLA is solely ground water. All references to this now terminated GWUDISW issue should be eliminated, and the focus on water development needs to remain on the SDWA Ground Water Rule (GWR).

Overarching Issues:
GWA continues to agree that major impacts will occur primarily in the north but GWA disagrees with DoD's continued subjective population distribution assumptions that the only major impacts will occur in the north. The population growth due to the military build-up will affect the water supply and wastewater treatment capacity throughout the island especially since DoD cannot direct the construction industry to house their workers in a particular village nor section of the island.

Statements that the Guam legislature has authorized GWA to finance improvements to the water and waste water systems does not recognize the environmental justice issue that the funding comes from GWA's rate payers. Rate impacts in financing these needs are very significant. (See also "**New Comment and Recommendation 4:**" below.)

Groundwater:
GWA has continued to identify significant concerns related to Guam's already stressed drinking water distribution infrastructure.

> **Previously Submitted Recommendation 10:** To address source water protection, long term water quality concerns, of the SSA (NGLA); include in the mitigation plan is the transfer of waste water sources currently on a septic systems to sewer systems.
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> **Previously Submitted Recommendation 12:** DoD needs to continue moving 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.
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> **New Comment and Recommendation 2:** Protection and recharge of the NGLA are not adequately addressed. The data collected thus far does not address either what the

upper limit of sustainable yield might be or the fact that the cost of aquifer management rises as the sustainable yield is approached.

The Groundwater Aquifer study by the USGS discusses several key findings that must be considered in the DSEIS. What this means for the proposed Cantonment Alternative A is that several mitigation measures beyond those minimally described in the SEIS must be considered.

The USGS study reports that:

- The freshwater-lens system is recharged by rainfall infiltration.
- Aquifer chloride levels in production areas need to be evaluated and managed.
- The horizontal hydraulic conductivity in the aquifer is one to two orders of magnitude greater than the vertical conductivity of the overburden matrix.
- Vertical porosity in the overburden matrix is occluded due to post-depositional changes in porosity by dissolution which connects secondary pathways.
- Temporary storage of infiltrating water in the Vadose Zone is significant.
- Infiltration is strongly dependent on the water content of the Vadose Zone.
- Recharge is dependent on the timing of individual rainfall events and the role of the unsaturated zone.
- Rapid infiltration from large rainfall events does not contribute to aquifer storage.
- Negligible recharge occurs during the dry season.

These findings can be interpreted to mean that recharge of the NGLA by rainfall through the vertical limestone matrix is significantly much slower than horizontal movement of water within the aquifer. These findings indicate that vertical flow of water towards the aquifer is highly dependent on the moisture within the upper layers of the limestone matrix and occlusion of the soil and rock pore spaces. And there is indication that fractures in the limestone and sinkholes may have an appreciable contribution to recharge because of their horizontal connectivity to the aquifer.

First, construction will cause significant removal of native limestone forest cover increasing impervious areas from 4.1% to 23%. This alone removes a considerable amount of recharge area, increases the amount of evaporation, and further reduces the supply of water for recharge. Construction and removal of jungle will also change land cover, affecting the degree of porosity of the impacted soils over approximately 1,000 acres of removed limestone forest. The changes in land cover will compact the soils and further occlude the soil and rock pore spaces. The affect is to reduce the infiltration into the aquifer and eliminate a significant volume of recharge.

Second, the SEIS considers Low Impact Development (LID) and detention basins as the methods to protect the NGLA. These methods are indeed a step in the right direction but may not be significant enough to adequately mitigate the recharge zones lost due to construction. The findings of the USGS study indicate that the detention basins, in order to provide the necessary infiltration, must be an order of magnitude larger than those traditionally designed for a development. Detention basins are typically designed to contain a certain storm recurrence, in this case, the 50-Year storm, which was verbally articulated in the public meetings. However, the basins should be additionally designed to keep the Vadose Zone moist and maximize the surface area for recharge especially during smaller, more frequent rainstorm events.

Third, the detention basins themselves are an impact and must be considered for LID. This may include keeping portions of the detention basins (and suggested pockets of the Cantonment Area) undeveloped and in its jungle state.

Fourth, the finding from the USGS that the horizontal hydraulic conductivity is greater than the vertical conductivity indicates that fractures in the limestone and sinkholes may have an appreciable contribution to recharge. The SEIS indicates that runoff is captured in depressions and sinkholes allowing infiltration to occur. Directing post-development storm water runoff to discharge directly into these sinkholes and depressions may seriously affect the quality of the water infiltrating into the aquifer. The SEIS briefly mentions the consideration of methods beyond LID for improving the quality of storm water runoff prior to discharge into recharge zones. Further evaluation on recharge water quality and volume should be addressed in the SEIS.

Finally, the technical information and recommendations on detention basins, LID designs, recharge water quality and volume must be conveyed to the future contractors, developers, and designers. What methods are proposed to assure that the proper designs are constructed and how will they be enforced? These questions must be addressed in the SEIS.

Best Management Practices require that proper permitting and continued coordination and evaluation of well monitoring of new wells is essential.

The impacts on aquifer recharge from impervious surfaces area increases with time need to be evaluated.

New Comment and Recommendation 3: To better monitor, manage and respond to the effects of groundwater production, both ongoing as well as planned, as well as to the effects of cyclical and long-term changes in Guam's rainfall, it is recommended that additional observation wells be planned for installation as identified in the May 2014 WERI-USGS proposal, "*Proposal for Rehabilitation and Expansion of the Hydrologic Data Collection Network and Monitoring in the Northern Guam Lens Aquifer*." As noted in the proposal, among the four groundwater basins in which new wells would most likely be installed in direct support of the buildup (Finegayen, Agafa-Gumas, Andersen, and Mangilao) there is currently only a single well (EX-8, in Northwest Field) capable of monitoring lens thickness and the distribution of salinity through the depth of the lens. There is also no monitoring well at the head of Yigo Trough, which supplies groundwater to the DOD's Marbo Series (MW 5-9) wells as well several GWA wells along the axis of the trough.

Nearshore Waters:
GWA has continued to identify significant concerns related to Guam's already stressed wastewater infrastructure. GWA does continue to concur with DoD's plan to upgrade the Northern District Wastewater Treatment Plant. However, there are still other wastewater concerns which have not been addressed.

Previously Submitted Recommendation 14: The EIS must address impacts to the

entire wastewater collection system, including the already stressed Central Guam collection system. Identification of impacts should include both anticipated military growth areas and ancillary impacts.

Previously Submitted Recommendation 15: The SEIS 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 including the 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.

Previously Recommendations 16: The SEIS must acknowledge the potential for impacts to this system; to the Hagåtña WWTP and other locations throughout Guam. Through the MOU, 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:
Although the population requirement of the buildup has decreased, the cumulative impacts of the projects continue to be underestimated. With the exception of the Northern District Waste Water Treatment Plan, the cumulative effect of this project on water and wastewater infrastructure and the effects on the NGLA are not present in the draft SEIS.

New Comment and Recommendation 4: The DSEIS (Page 4-108) assumes that because GWA has been authorized to issue bonds to fund GWA WRMP, 2011 Court Order as well as other organic population growth needs, that GWA is therefore able to absorb the costs of induced growth issues without DoD funding support. GWA's rates are subject to CCU and PUC scrutiny and when raised to meet induced impacts are unfair to GWA's ratepayers. This becomes an environmental justice issue. It is unrealistic, particularly because growth induced support workers will not be expected to reside in DoD cantonments. In the July 16, 2010 Memorandum of Understanding between DoD and GWA on Page 5 Section VI, Item 4, DOD "*Agreed upon costs associated with meeting DoD requirements will be allocated to and paid for by DoD through a utility agreement*"

Previously Submitted Recommendations 17: The SEIS 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.

Previously Submitted Recommendation 19: DoD must include in the ***[S]***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~~ **[reduced]** military build-up.

The mitigation as indicated in (**Previously Submitted Recommendation 19**) must extend to the issues discussed in DSEIS Page 4-110 to include such items as water distribution system leakage, wastewater Fats Oil and Grease (FOG), sludge and potential industrial wastewater.

New Comment and Recommendation 5: It would seem that with the construction of permanent training facilities (e.g. LFTRC's and HG range) [Ref DSEIS Page 5-73] that the use of portable toilets is inconsistent with a permanent training facility. Permanent Sanitary Facilities should be included as a part of the training complexes with proper water and waste water connections to existing infrastructure.

New Comment and Recommendation 6 : With the Senior Advisory Group (SAG) and Working Group (WG) in place, recommend that the group(s)

- Identify a process for DoD to share Best Management Practices and mitigation measures which can be implemented without any cost to GWA and the community of Guam.
- Identify source of funding to study contaminants in the aquifer, using caffeine as an indicator, along the Yigo-Tumon trough to determine septic tanks/leachate impacts on the aquifer since a large population with septic tanks/leachate fields are located along the trough and this population is expected to increase as an impact of the build-up.
- Identify source of funding to conduct a feasibility study of installing a dedicated transmission system at the northern portion of the island that can be used to blend water and convey water from high producing, good quality wells to serve the population in areas of poor production, poor quality wells.

Respectfully submitted,

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Acting General Manager

CC:

Office of the Governor of Guam
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