# A PRESENTATION ON POWER, WASTEWATER, AND WATER UTILITY ISSUES ARISING FROM PROPOSED MILITARY BUILDUP

GUAM WATERWORKS AUTHORITY

GUAM POWER AUTHORITY
GPA
POWER TO SERVE

# GOALS

- PROVIDE THE LATEST INFORMATION AVAILABLE
  - What's in the DEIS
  - Recent discussions since the release of the DEIS
  - Emerging Solutions
  - Unresolved Issues
  - Policy perspectives
  - Q & A

# Presentation Outline

GUAM POWER AUTHORITY

- Joaquin C. Flores, P.E. GM
  - Power Generation
- Melinda R. Camacho,P.E. Manager, Engineering
  - Power Transmission

GUAM WATERWORKS AUTHORITY

- Julie Shane, Senior Engineer Supervisor
  - Wastewater
- John Benavente, P.E. GMCUS
  - Water
- CCU
  - Simon A. Sanchez, II, Chairman

# THE PROPOSED GUAM MILITARY BUILDUP: THE DEIS & GPA/DoD DISCUSSIONS TO DATE

January 27, 2010

# Major Issues

- Draft Environmental Impact Statement (DEIS) Report
- Generation
- Renewable Energy/Fuel Diversification
- Transmission and Substation
- Unresolved Issues
- CCU/GPA Perspectives

# Negotiating Principle

In typical utility cost allocations, if the requirements of a large customer change, all customers will bear a portion of the cost to serve the increased requirements.

GPA is committed to the principle that civilian ratepayers should be shielded from cost impacts resulting from the military buildup.

# DEIS Report

- Projects load requirements for Okinawa Base relocation and other Department of Defense (DOD) upgrades
  - 80 Megawatt (MW) Requirement
  - Upgrade Transmission and Substation system as necessary
- Investigates capacity requirements to meet reliability criteria and load demand
- Provides alternatives to address additional load and capacity requirements which includes
  - Options for new Generation
  - Upgrades to existing GPA and DOD generation plants
  - Implement aggressive demand side management and renewable programs

# DEIS: Generation Discussions

- Interim Solutions - Construction Phase
  - 1 – Combustion Turbine (CT) Reconditioning
  - 2 – CT Reconditioning & Increasing Operating Hours
  - 3 – CT Reconditioning & Orote Plant Upgrade
- Long Term Solutions - Post Construction
  - 1 – New Plant at Cabras/Piti ~ 80 MW
  - 2 – New Potts Junction Plant
  - 3 – GPA determines generation solution

# Generation Ongoing Discussions

- Regular meetings with DOD:
  - Firming of new DOD load projections.
  - Discussions on preferred power alternative solutions.
  - Discussions on system reliability concerns and plant assessment.
  - Local and federal renewable portfolio standards and mandates

# Generation Emerging Solutions

New Demand for Military Buildup is Much Lower

- 25 MW firm load (Previously 60 MW in DEIS)
- 15 MW transient/intermittent load - Carrier/Amphibious Vessels (Previously 39 MW in DEIS)

DOD remains a GPA customer for all its needs

GPA/Navy Customer Services Agreement (CSA) should be extended

# Generation Emerging Solutions

GPA Generation Capacity – 552 MW

Current Peak – 272 MW

Peak after Build Up ~ 312 MW (est)

Extra Generation Capacity after build up – 240 MW

GPA & DOD agree there is sufficient generation capacity to support the build up

# Generation Emerging Solutions

- GPA & DOD agree that 3 GPA CT's should be refurbished to support construction phase
  - Estimated at $30 million (To be paid by DOD)
  - CT's located at Dededo & Yigo (~60 MW)
  - Start by 2012
- Navy has initiated assessment for refurbishment of 5 CT's - Study has commenced
- GPA & DOD investigating use of Public/Private Partnerships to implement solutions
- DOD to pay "reliability fee" for the cost to refurbish and operate CT's to repay $30 million
- All existing civilian ratepayers will benefit from this improvement in reliability

# Generation Unresolved Issues

- GPA believes Military build up moves the need for the next base load earlier than 2022
- GPA and DOD have yet to determine and agree on impact of Build Up on timing of the need for the next base load
- GPA believes DOD should pay for impacts caused by accelerating the need for the new base load

# DEIS: Renewable Energy

- DEIS Renewable Options
  - OTEC
  - Geothermal
  - Solar
  - Wind
  - Biomass
  - Fuel Cells
  - Wave/Tidal

# Alternative Energy & Fuel Diversification - Ongoing Discussions

- GPA and DOD have been working collaboratively on renewable efforts
  - DOD has provided GPA wind data from DOD wind towers
- GPA and DOD continue to discuss renewable energy options to support and meet federal and local policies.
- Fuel diversification strategies and shared costs considerations for evaluating Liquefied Natural Gas supply options and Geothermal exploratory investigations.
- Energy Conservation - The cheapest form of energy is the one you don't need.

# DEIS: Transmission & Substation

- DEIS: Upgrade Transmission & Distribution systems
- DEIS T&D Projects estimated at $200 M
- DEIS projected 120 MW of growth at the military bases
  - Andersen
  - Orote
  - Polaris
  - Radio Barrigada
  - NCTams
  - Northwest Field
  - Andy South

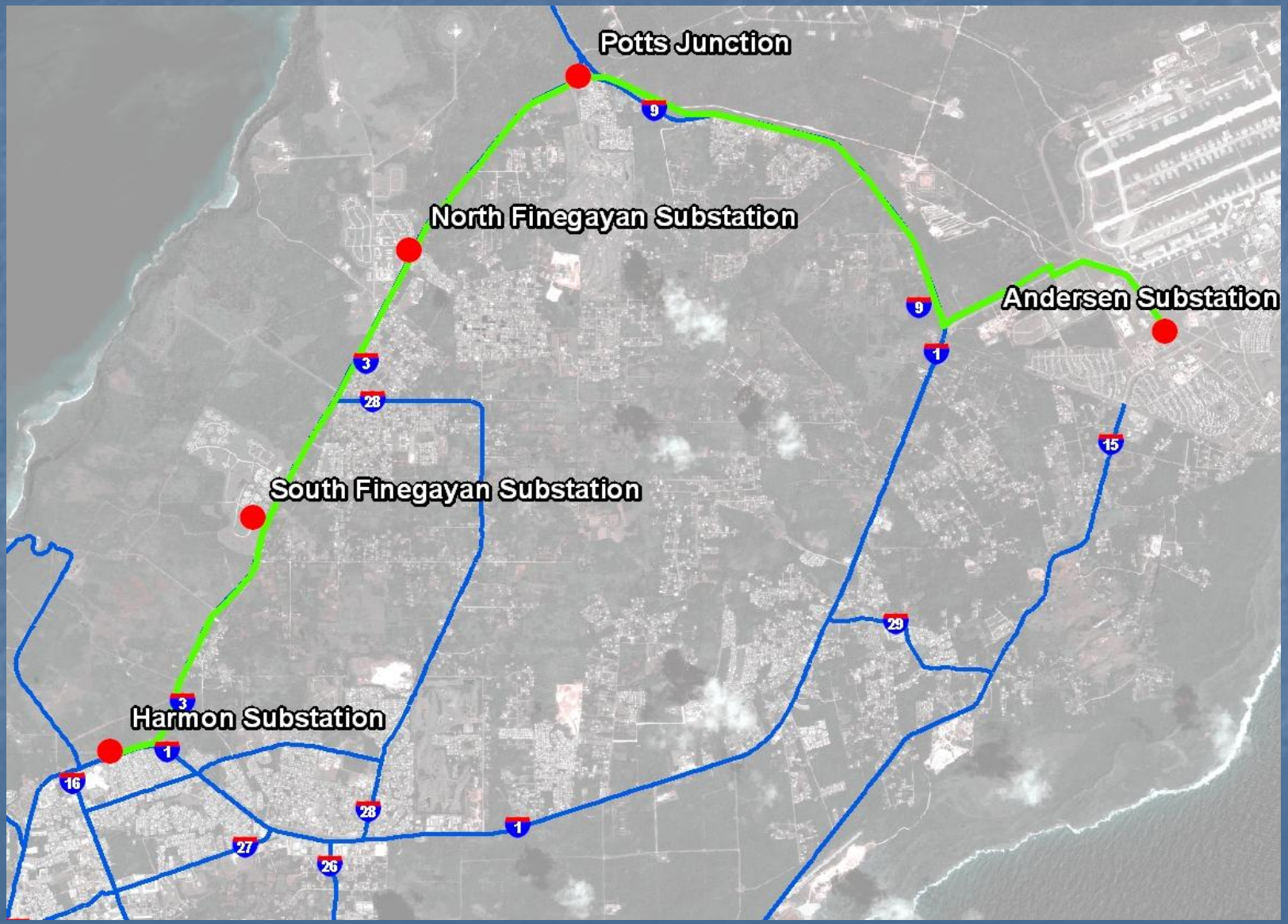
# Transmission & Substation Emerging Solutions

- Emerging DOD Preferred Alternative: DOD remains a transmission level customer of GPA
- Based on most recent DOD load data, GPA proposes $77 million of projects to respond to the increased demand requirements from the buildup.
- GPA & DOD are discussing having DOD pay this amount as an equivalent "system development charge" for tying the new facilities to the grid
- Solutions provide additional capacity for future growth in these areas

# Transmission & Substation Upgrades NORTH

| | PROJECT | | | EST. COST (X $1,000) |
|---|---|---|---|---|
| 1 | Harmon to Andersen 115 kV Overhead Line | 12 | miles | 21,788 |
| 2 | Andersen Substation 112 MVA Transformer and Substation | | | 4,830 |
| 3 | Andersen Substation Capacitor Banks (2-6 MVAR) | 12 | MVAr | 315 |
| 4 | North Finegayan Substation Capacitor Banks (2-6 MVAR) | 12 | MVAr | 315 |
| 5 | North Ramp Substation Capacitor Banks (2-3 MVAR) | 6 | MVAr | 158 |
| 6 | Harmon - North Finegayan - Underground Line | 4 | miles | 9,818 |
| 7 | North Finegayan - Potts Junction - Andersen - Underground Line | 7 | miles | 15,593 |
| 8 | Harmon - North Finegayan Overhead Line Upgrade | 4 | miles | 945 |
| 9 | North Finegayan - Potts Junction - Andersen - Overhead Line Upgrade | 7 | miles | 1,523 |
| 10 | Harmon Substation Reconstruction 115 kV & 34.5 kV | | | 7,508 |
| | TOTAL PROJECTS - NORTH | | | 62,790 |

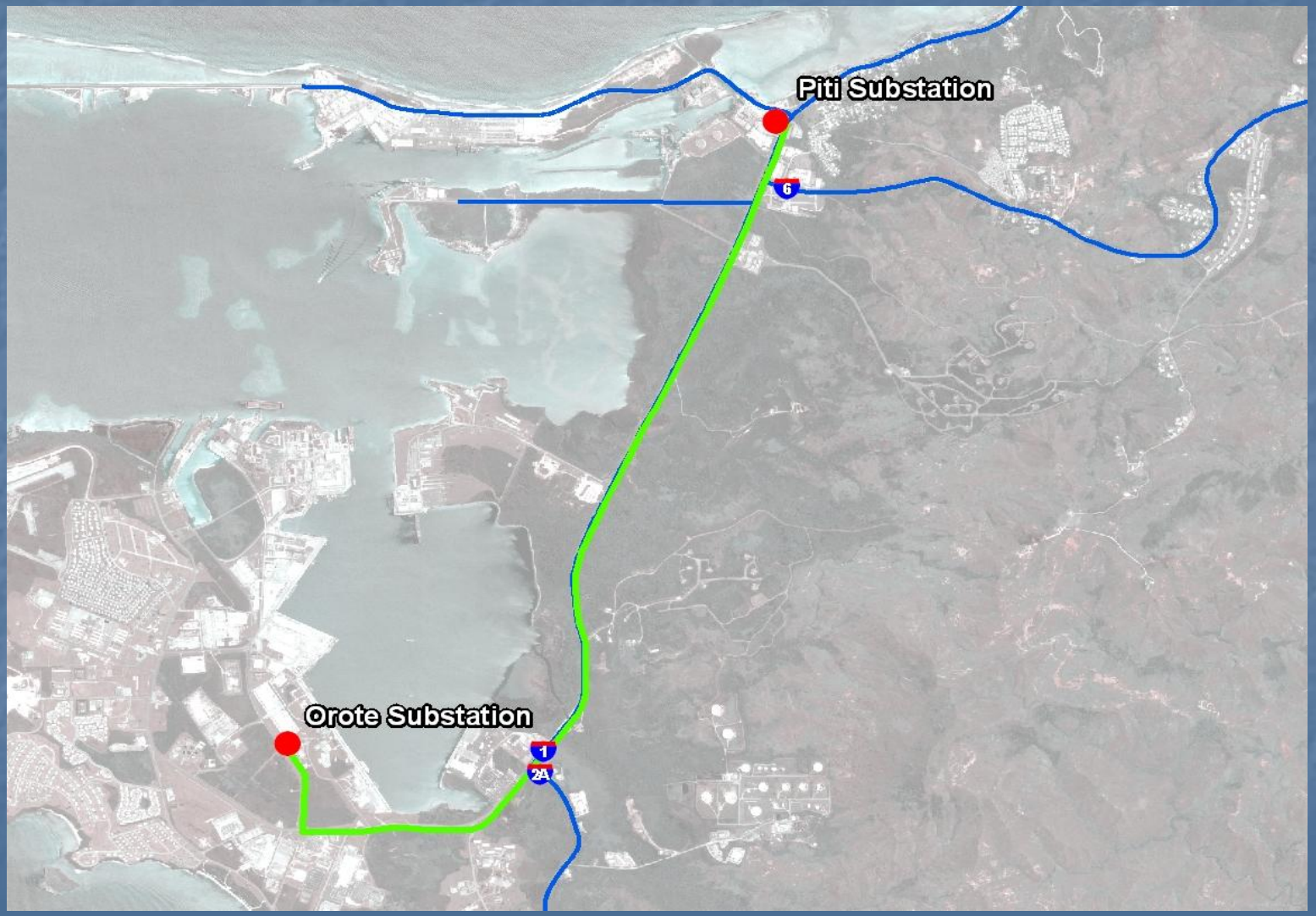
# Transmission & Substation - NORTH



# Transmission & Substation Upgrades
## SOUTH

| | PROJECT | | | EST. COST (X $1,000) |
|---|---|---|---|---|
| 1 | Piti to Orote 115 kV Overhead Line | 4 | miles | 8,505 |
| 2 | Orote Substation 112 MVA Transformer and Substation | | | 4,830 |
| 3 | Orote Substation Capacitor Banks (2-6 MVAR) | 12 | MVAr | 315 |
| 4 | Polaris Point Capacitor Banks (2-3 MVAR) | 6 | MVAr | 315 |
| 5 | Piti X20 to Orote X35 Overhead Line Upgrade | 4 | miles | 945 |
| | TOTAL PROJECTS - SOUTH | | | 14,910 |

# Transmission & Substation - SOUTH



# Unresolved Issues

- CCU/GPA position: DOD should pay for its impact, direct and indirect
- CCU/GPA committed to shielding existing ratepayers from negative impact
- Financing to be determined

# CCU/GPA Perspectives

- CCU/GPA believes the investments that arise from the proposed buildup can result in benefits to customers:
  - Economies of Scale (lower costs)
  - Quicker Restoration following disaster
  - Improved Generation Reliability
- CCU/GPA views the projected military build up load requirements (direct and indirect) for generation, transmission, and substation as achievable.

# Si Yu'os Ma'ase

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# THE PROPOSED GUAM MILITARY BUILDUP: THE DEIS & GWA/DoD DISCUSSIONS TO DATE

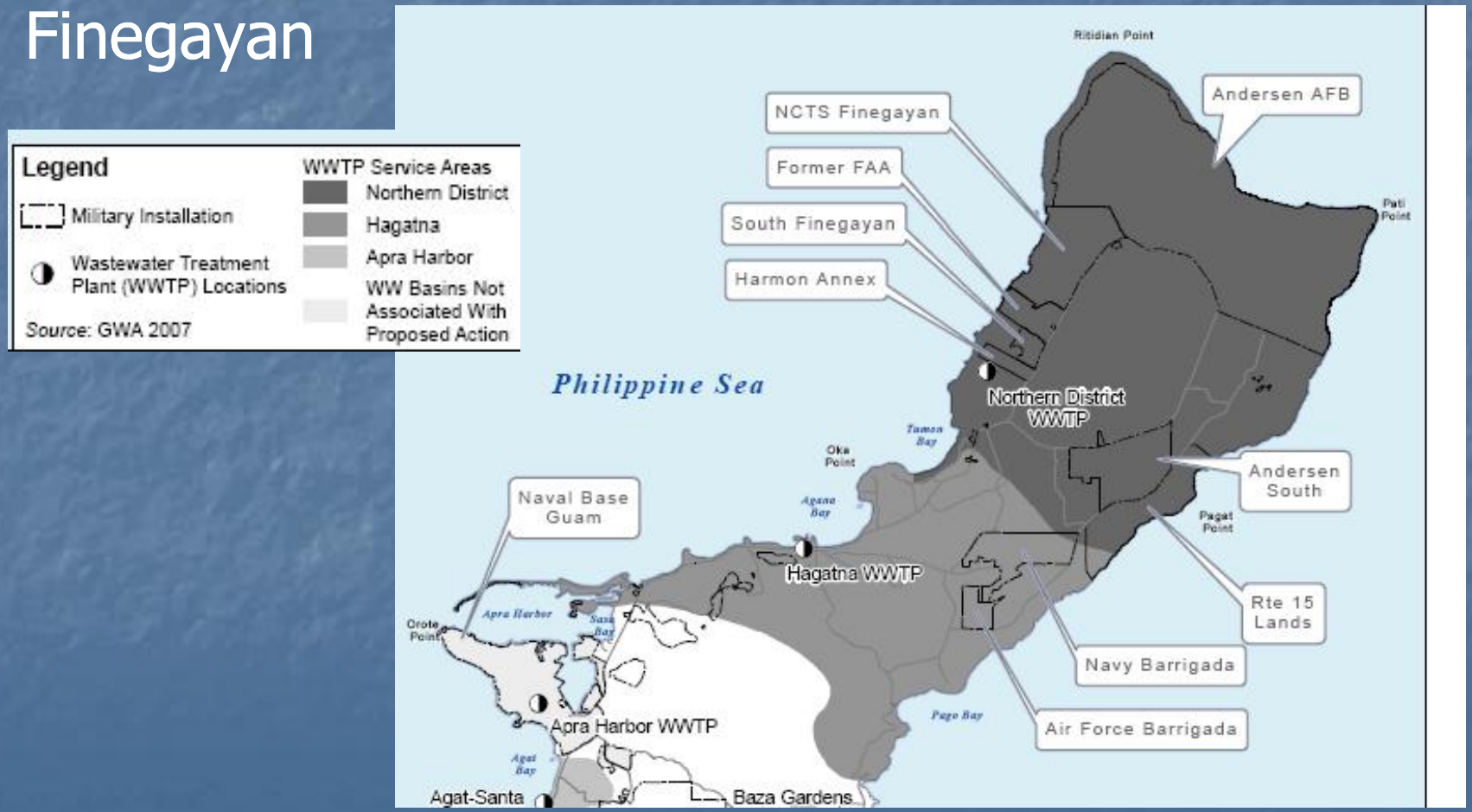
January 27, 2010

# Overview of Presentation

- Review of the DEIS and Wastewater (WW) Treatment & Collection Alternatives
- Review of DoD/GWA on-going WW Discussions: Emerging Solutions and Unresolved Issues
- Review of the DEIS and Water Supply Alternatives
- Review of DoD/GWA on-going Water Discussions: Emerging Solutions and Unresolved Issues
- Water: CCU/GWA Perspectives

# DEIS: Wastewater (WW) Treatment Alternatives

## DEIS Alternatives 1 & 2: Marine Base & Housing in Finegayan



# DEIS: Wastewater (WW) Treatment Alternatives

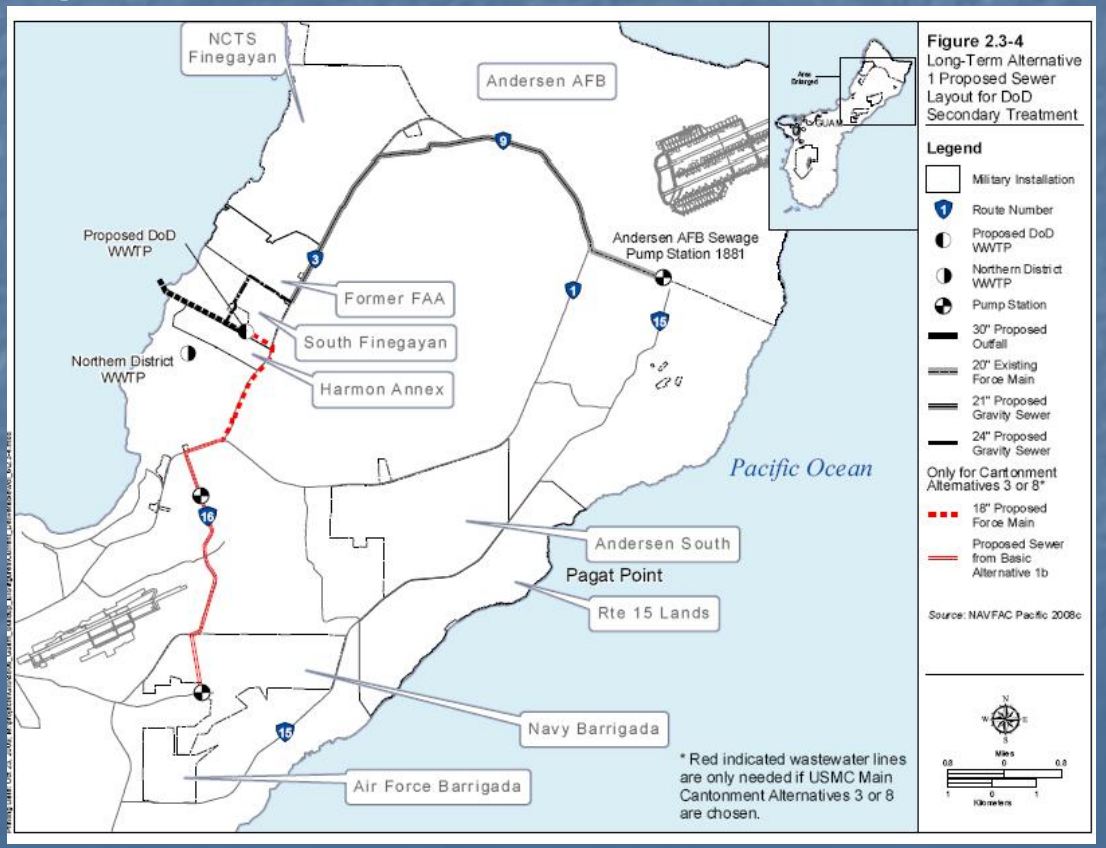
- DEIS Options for WW Treatment if Marine Base & Housing are all in Finegayan (Alt. #1 & 2)
  1. Upgrade GWA Northern Wastewater Treatment Plant (NWWTP) to full primary treatment
  2. Upgrade GWA NDWWTP to secondary treatment

  3-8: All various options for new DoD WWTP / separate from GWA

# DEIS: WW Treatment Alternatives

EIS Alternatives 3 & 8:

- Marine Base in Finegayan
- Some Marine Housing in Barrigada (red)



# DEIS: WW Treatment Alternatives

DEIS Options for WW Treatment for DEIS Alternatives 3 & 8:

- Finegayan Treatment options same as Alt 1 & 2 (use GWA NWWTP)
- WW treatment options for Barrigada:
  1. Pump wastewater to NWWTP
  2. New gravity sewer line to Hagåtña WWTP
  3. New DoD WWTP on east side of island

# DEIS: WW Collection System

- DoD to build new sewer line from Finegayan base to NWWTP
- DEIS does not look at other "collection" impacts.

"Collection" involves moving WW thru a system from users to a WWTP

- Insist "development fees" from new users will cover costs
- Ignores limitations of Sewer Pump Stations (SPS) and other sections of system
- No discussion of impacts to Central Guam and the impact to the HWWTP

# GWA/DoD WW Treatment: Emerging Solutions:

## Upgrade and Expand NDWWTP with Marines becoming a GWA customer (like AAFB)

- End 2013 – complete rehab of NWWTP to provide "primary" treatment
  - Marines would need to provide $50M
  - Rehab required to handle construction surge load

# GWA/DoD WW Treatment: Emerging Solutions:

## Upgrade and Expand NDWWTP with Marines becoming a GWA customer (like AAFB)

- End 2016 – complete next upgrade
  - Secondary Treatment would be mandatory due to increased WW loads from buildup
  - Estimated to cost about $150M
- ~2021 Plant Capacity Expansion
  - Expand from 12 to 18 million gals/day (MGD)

# WW Collection System Emerging Solutions:

- DoD to build new sewer line from Finegayan base to NWWTP paid by DoD
- DoD also studying the Route 3 sewer line from AAFB to NWWTP to see if it can handle expected growth
  - Study not complete in time for DEIS
  - If Route 3 sewer line capacity is insufficient to meet growth, then DoD proposes to install a new sewer along Route 3

# Wastewater: Unresolved Issues

- Resolve flow volumes for military and civilian growth caused by buildup
- Determine impacts to Central Guam (Hagatna WWTP & collection impacts)
- Resolve impacts to NWWTP outfall
- Resolve Funding issues.

# DEIS: Water Supply Alternatives

- DEIS Alternatives
- Ongoing Discussions, Emerging Solutions and Unresolved Issues

# DEIS: Aquifer Yield

- Aquifer can yield 80 million gallons/day (MGD)[1]
- Current usage is 50 MGD
- Peak during construction surge is 63 MGD
- Post construction (base open) usage is 58 MGD
- After build-up ~22 MGD will remain in reserve

1 – Theoretical Sustainable Yield from 1992 Groundwater Study by Barrett/Mink. 2009 Review by UOG-WERI. Concurred by GWA, DoD, GEPA.

# DEIS: On Base Water Options

- 22 New wells on Military property (preferred)
- Rehab existing Wells
- Purchase additional GWA water
- Dredge Fena Lake to increase capacity

# DEIS: On Base Water Options

- Elevate dam at Fena to increase capacity
- Reclaim through reuse
- Reclaim through groundwater recharge
- Desalinization
- New surface water source (Lost River)

# DEIS: Off-Base Water Options

- Only option presented is for GWA to drill 16 additional wells
- DEIS states that there is enough water supply

  "*provided that the proposed [GWA] system expansion is operational in time to meet"* the buildup
- No additional off-base options proposed in DEIS

# Water: GWA/DoD On-Going Discussions

- Improve the water supply and distribution systems for all of Guam
- Joint management of the aquifer
- Work towards an integrated water system

# Water: GWA/DoD
# Emerging Solutions:

- DoD has proposed to sell additional water from their new wells to GWA to support construction build-up until GWA's new wells come on-line.
- "Construction housing" customers of GWA would pay GWA for their consumption to off-set DoD water sales to GWA until new wells come on line

# Water: Unresolved Issues

- Military plans don't address funding for impacts to off-base GWA resources
  - Source/funding for off-base well development
  - Water Storage (e.g. Tanks)
  - Water Transmission (moving water from wells to tanks)
  - Water Distribution (moving water from tanks to customers)

# Water: Unresolved Issues

- DoD insists that "development fees" will address all system growth
- GWA does not concur
  - Individual contractors will upgrade only direct impacts (adjacent water lines, potentially an additional well)
  - Does not address cumulative impacts on
    - Major  water lines
    - Storage tanks
    - Water pumps

# Water: CCU/GWA Perspectives

- CCU/GWA goal is to protect the "priceless" northern aquifer to ensure that we have enough clean water to meet:
  - The long term future needs of all the people of Guam, with our without the buildup
  - Guam's projected civilian growth and development
  - The needs of the proposed military buildup

# Water: CCU/GWA Perspectives

- CCU/GWA: The only way to insure all civilian and military customers receive the same level of service, reliability and lower costs is to operate one fully integrated water system
- GWA should follow the GPA model to eventually take over the operation of all DoD water and WW systems, converting DoD to a customer

# Water: CCU/GWA Perspectives

- Existing GWA system is fragile
  - Over $300M in upgrades planned in the next 5 years to begin to fix and upgrade existing GWA systems, regardless of proposed buildup
  - "Connecting" a new water system to serve the projected growth in northern Guam must be well coordinated to insure GWA's plans to upgrade existing systems are not compromised

# Water: CCU/GWA Perspectives

- DoD must pay for all impacts, direct and indirect, arising from the buildup
  - Indirect Impacts
    - Civilian growth accelerated/caused by the buildup
      - Wells/water sources
      - Operational costs & personnel
      - Storage tanks
      - Transmission lines

# SUMMARY OF UTILITY ISSUES FACING BUILDUP

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# GPA: Power

- The actual power needs for the buildup appear to be much less than the loads projected in the DEIS
- Emerging Solution: Upgrade existing CT units for $30M (est.) at DoD expense
- Emerging Solution: Upgrade Transmission system for $80M (est.) at DoD expense

# GWA: Water

- Protecting the "priceless" northern aquifer is essential to ensure that we have enough clean water to meet:
  - The long term future needs of all the people of Guam, with our without the buildup
  - Guam's projected civilian growth and development
  - The needs of the proposed military buildup
- There is enough water in the northern aquifer to support the construction surge and the new Marine presence, while leaving aquifer reserves for future growth
- Emerging Solution: Build 22 new wells on military property and 16 new wells on civilian property

# GWA: Water

- Emerging Solution: Water for the construction surge can be provided by DoD wells until new GWA wells come on line
- Military plans don't address impacts to off-base GWA water system resources
- The system upgrades that may be required by the buildup provide an opportunity to begin the eventual unification of all DoD and GWA system assets under GWA (GPA model)

# GWA: WasteWater

- Emerging Solution: Upgrade and Expand NDWWTP with Marines becoming a GWA customer (like AAFB)
  - DoD could pay $50M for WW improvements needed to support the construction surge
  - DoD could pay for additional improvements required to support the buildup after construction
- DoD would pay for its sewer line from its new base and may pay to upgrade Route 3 sewer line if it is necessary
- Military plans don't address impacts to off-base GWA infrastructure

# Other General Perspectives

- Existing ratepayers should not bear any infrastructure burden caused by the buildup. Existing ratepayer resources should remain dedicated to paying for costs and improvements needed to existing systems, whether or not the buildup comes
- DoD must pay for all impacts, direct and indirect, arising from the buildup
  - Indirect Impacts: Civilian growth accelerated/caused by the buildup
- Funding issues have not been resolved

# Other General Perspectives

- A number of technical issues for power, water and WW also need to be resolved
- If the buildup comes, and if buildup funding is provided in a timely manner, the projected requirements are achievable
- The system investments required from the buildup can produce additional benefits for existing and future customers