

Water Utility Infrastructure Challenges in Underserved Communities

Gilbreeze Subdivision Water and Sewer Systems, Yigo, Guam

Miguel C. Bordallo, P.E.,
Guam Waterworks Authority

Presentation Agenda

- Guam Waterworks Authority System Overview
- History of Capital Planning and Improvement Program
- Current 5-year Capital Improvement Program
- Project Highlight: Gilbreeze Subdivision Water and Sewer Systems
- Challenges and Considerations

GWA Wastewater System

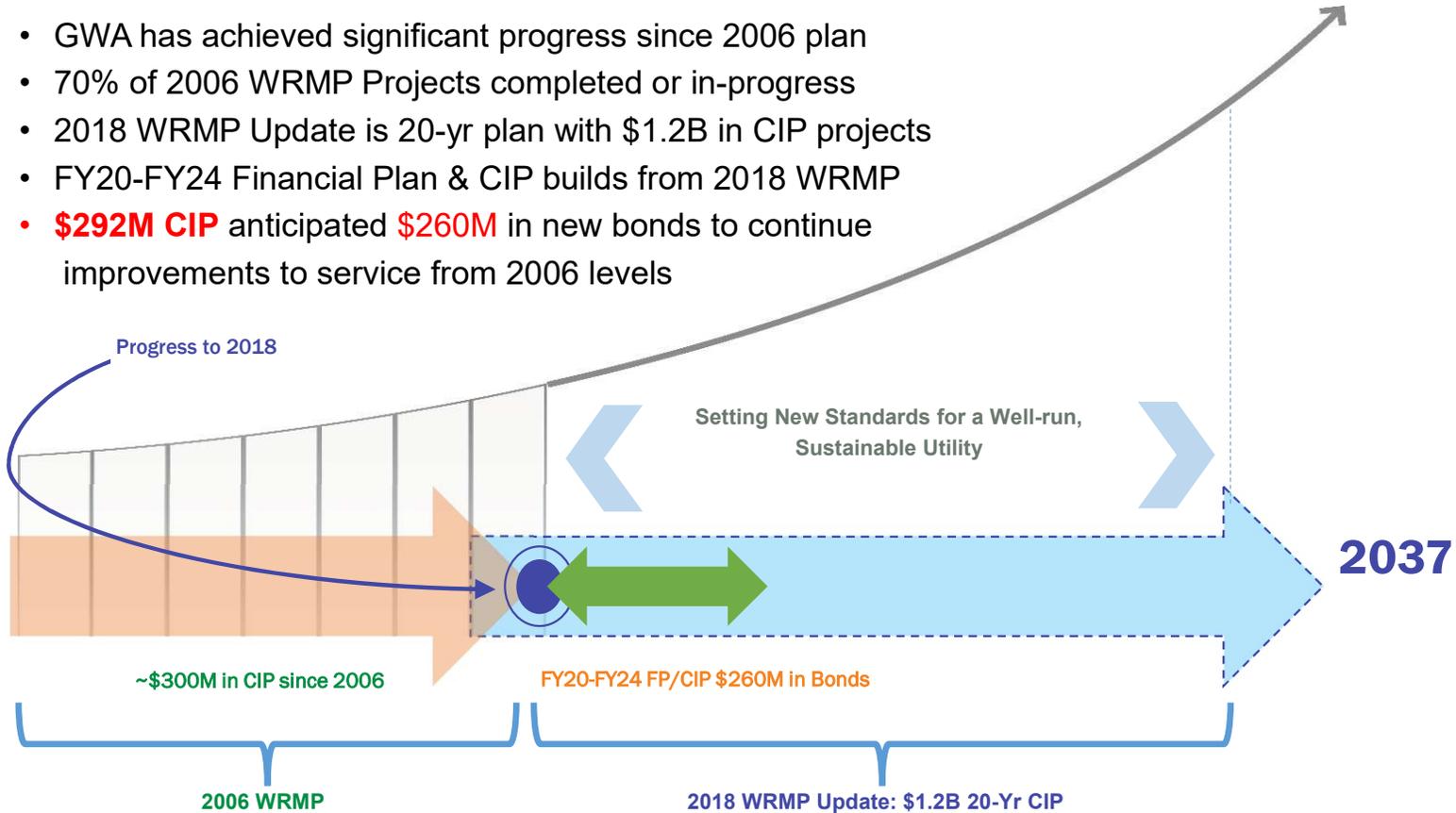
Wastewater System

- ~29,000 customers
- ~300 miles of collection system piping
- 78+ wastewater lift stations
- 6 wastewater treatment plants



GWA's FY20-24 Financial Plan & 2018 Water Resource Master Plan Update

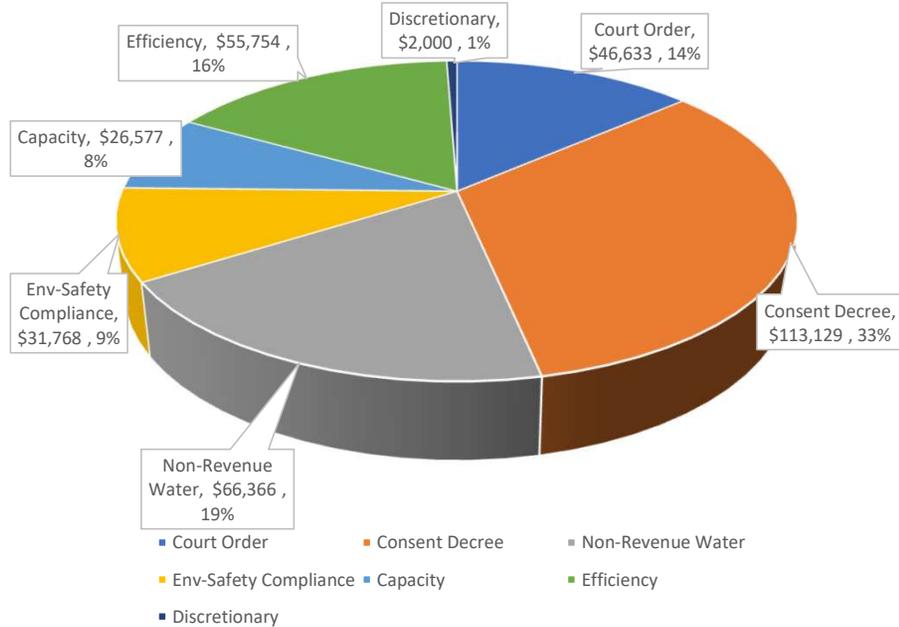
- GWA has achieved significant progress since 2006 plan
- 70% of 2006 WRMP Projects completed or in-progress
- 2018 WRMP Update is 20-yr plan with \$1.2B in CIP projects
- FY20-FY24 Financial Plan & CIP builds from 2018 WRMP
- **\$292M CIP** anticipated **\$260M** in new bonds to continue improvements to service from 2006 levels



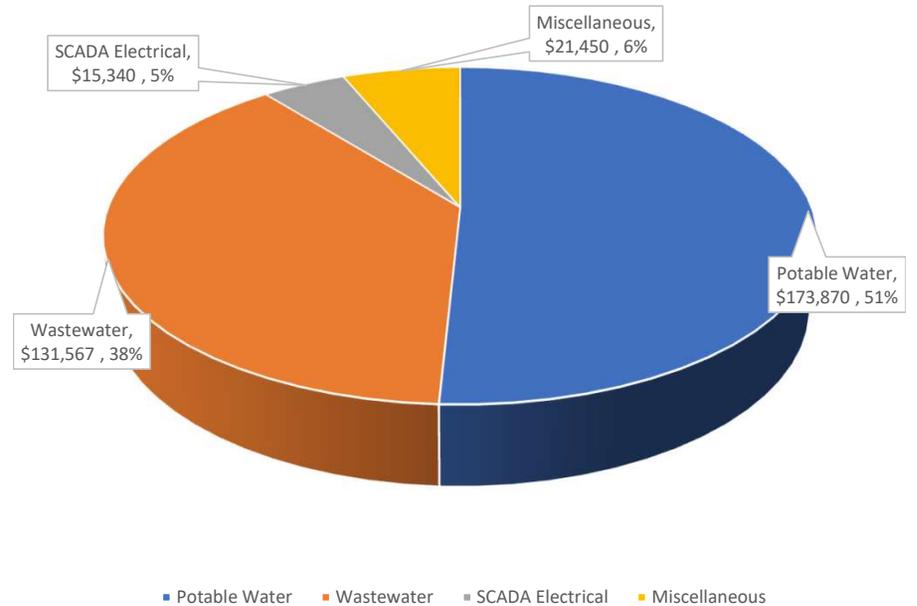
GWA Capital Improvement Program

\$342M for FY20-FY24

**Capital Program Allocation
By Project Type - (\$000)**



**Capital Program Allocation
By System - (\$000)**



Before: Original Agat-Santa Rita WWTP



After: New Agat-Santa Rita WWTP



Before: Original Chaot Water Storage



After: New Water Chaot Storage Tank



Before: Original Testing Laboratory



After: New Compliance Laboratory



Before: “Down Hard” Well D-17



After: Refurbished Well D-17

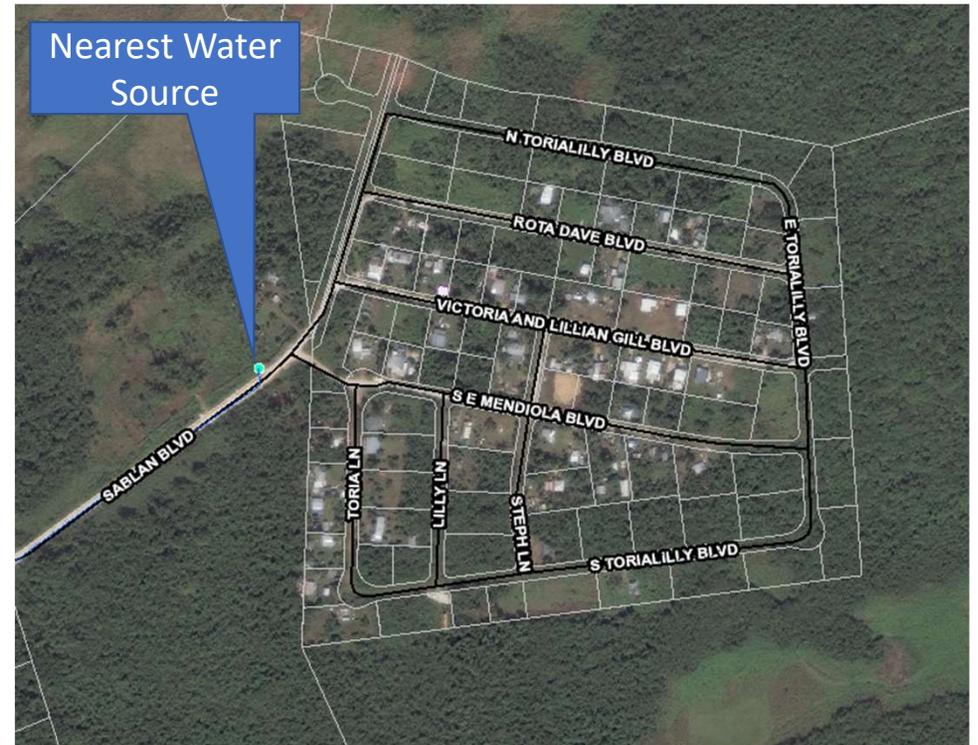


Project Highlight: Gilbreeze Subdivision

Underserved Community in the Northern Village of Yigo, Guam

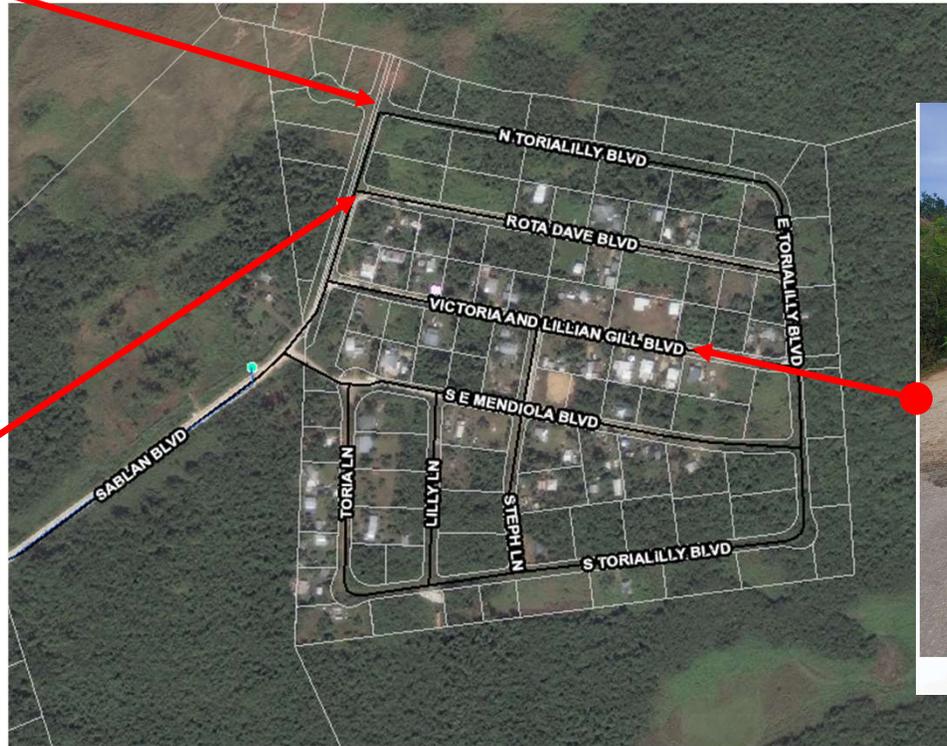


Faucet



Project Highlight: Gilbreeze Subdivision

Underserved Community in the Northern Village of Yigo, Guam



Victoria Lillian blvd



heading to Toria Lilly blvd on the right

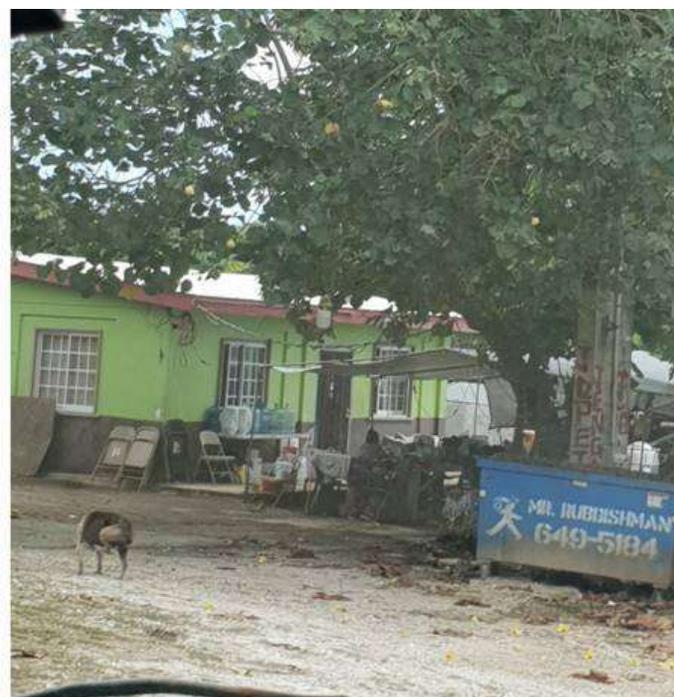


Rota Dave blvd



Project Highlight:
Gilbreeze Subdivision
Underserved Community
in the Northern Village of
Yigo, Guam

- Homes may not be constructed to Building Code requirements
- Temporary / makeshift water storage facilities (drums/totes)
- Unimproved subdivision / no drainage or paved roads

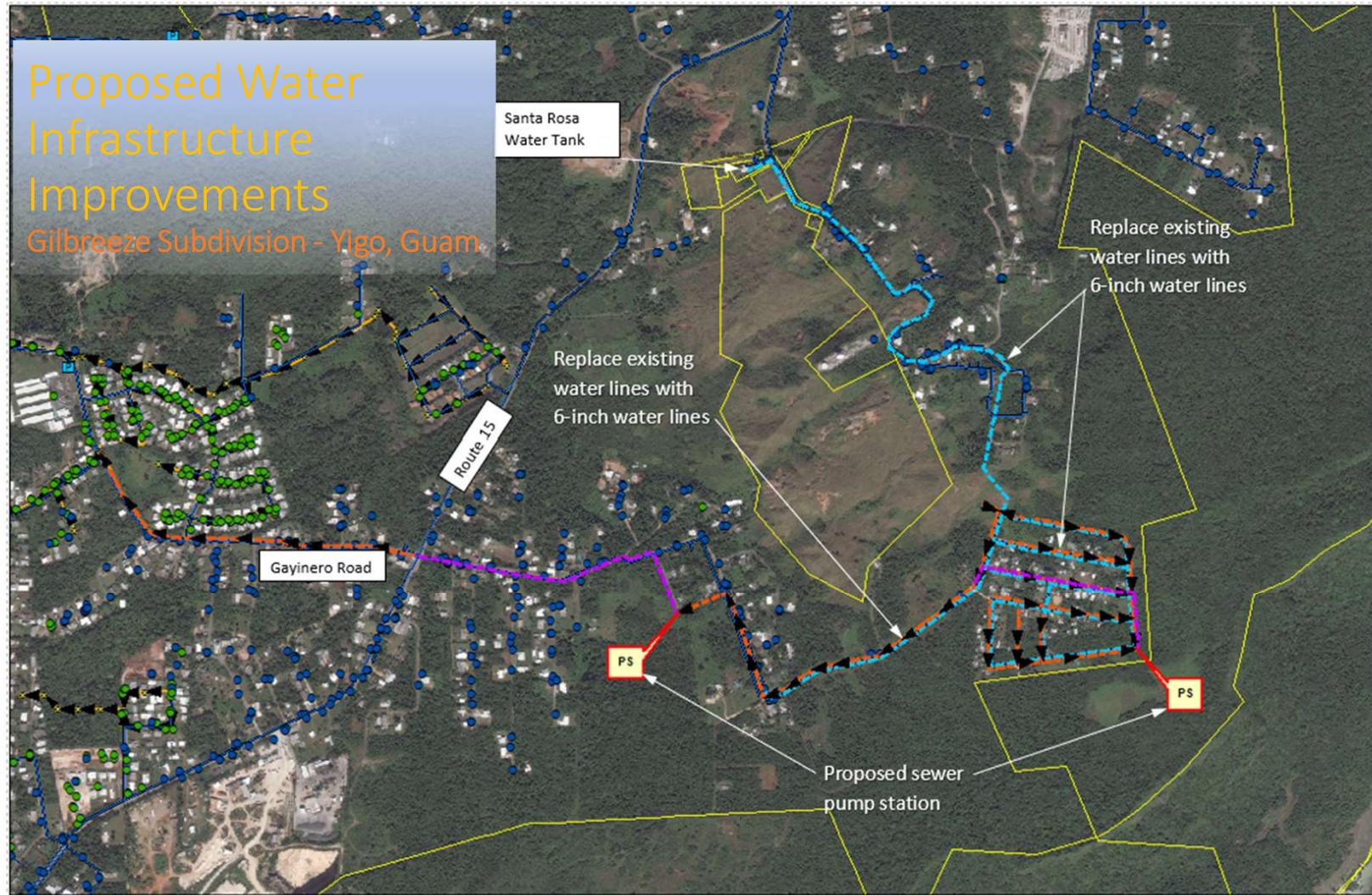


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Proposed Water Infrastructure Improvements

Gilbreeze Subdivision - Yigo, Guam



VICINITY MAP



Legend

- Water only
- Water and Sewer
- Water Production Well
- Water Distribution Main
- Sewer Pump Station
- Wastewater Treatment Plant
- ◇ Sewer Manhole
- Sewer Forcemain
- Gravity Sewer
- Proposed 8-inch Gravity Sewer
- Proposed 6-inch Sewer Forcemain
- Proposed 6-inch Water Line
- Chamorro Land Trust



- Notes:
1. This map was created on 8/6/2020
 2. This map is a general presentation of collected data.
 3. All data must be field verified for accuracy.

Water System Improvements

Water System Description:

Six-inch diameter water mains with hydrants will be constructed in the Gilbreeze Subdivision. Due to the subdivision’s elevation, a booster pump is needed to provide sufficient water pressure. Two options for booster pumps are:

- Option 1: Construction of a 6-inch water main from the Santa Rosa Tank and future booster pump to the top of Mt. Santa Rosa to connect to the Gilbreeze water system. An easement will be required for this option.
- Option 2: Construction of 6-inch water main from a hydrant on Gayinero Road to the Gilbreeze water system. A booster pump station and land will be required for this option.

System Component		Estimated Unit Cost	Number of Units	Cost
6-inch water mains at the Gilbreeze Subdivision		\$275/linear foot (LF)	9,600LF	\$2,640,000
Offsite water system improvements – Option 1	6-inch water main from the Mt. Santa Rosa tank to the subdivision	\$275/LF	5,000LF	\$1,375,000
	Land purchase for easement	\$100,000	1	\$100,000
Offsite water system improvements – Option 2	6-inch water main from a hydrant on Gayinero Road to the subdivision	\$275/LF	2,000	\$550,000
	Booster pump station and land purchase	\$1,500,000	1	\$1,500,000

Sewer System Improvements

Sewer System Description:

A gravity sewer system will be installed in the Gilbreeze Subdivision. Due to elevations, most of the lots will need to drain towards a sewer pump station in the southeast corner of the subdivision. A force main will convey wastewater to another gravity system at the entrance to the subdivision. This gravity system will drain towards a low point east of Route 15, where a second pump station is needed to pump wastewater to Gayinero Road. A second force main will convey wastewater to west of the Route 15/Gayinero Road intersection, where a new 3,000-foot gravity system will connect to an existing manhole. Wastewater eventually drains to the Yigo Sewer Pump Station, which might need to be upgraded to accommodate the new wastewater load.

System Component	Estimated Unit Cost	Number of Units	Cost
Gravity sewer system (8-inch diameter)	\$630/LF	15,500 LF	\$9,765,000
Sewer pump stations, including land	\$2,100,000 / station	2 stations	\$4,200,000
Sewer force main (6-inch diameter)	\$275/LF	4,700 LF	\$1,292,500
Potential Yigo Sewer Pump Station upgrade	\$800,000	1	\$800,000
Water Option 1 and Sewer Costs			\$20,172,500
Water Option 2 and Sewer Costs			\$20,847,500

Execution Challenges and Considerations

COST ISSUES

Customer Costs for Service

- Service Lateral Construction
- System Development Charges (one time)
 - Water: \$2,126
 - Sewer: \$3,474
- Monthly Water / Sewer Charges
 - Average Monthly Bill \$XX.XX

CONSTRUCTION / CONNECTION ISSUES

- Substandard Construction
 - Building Code requirements
 - Interior piping quality
- Backflow prevention
- Onsite water sampling
- Separation of buried utilities on private property
- Potential damages for private piping failure

BIL Implementation Challenges

- Rising construction costs on Guam due to
 - Military buildup
 - Lack of construction labor (H2-B Visa Issue)
 - Global supply chain issues
- Buy America / Buy American provisions add to implementation costs
 - 30% increase in material costs over equivalent available products
- Increase in oil/fuel prices contribute to higher construction costs
 - Shipping cost impacts from fuel surcharges
 - Construction equipment related fuel costs

Potential Solutions

- H-2B visa waiver for non-military construction
- Blanket waiver of Buy America / Buy American provisions
- Flexibility on use of BIL funds for private property improvements to defray connection / construction costs for low-income customers