Development of Realistic Residential and Commercial Water Demands for Use with the Saipan Water Distribution System Model

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The US Environmental Protection Agency (EPA) has recently stressed that the water treatment system in Saipan, CNMI is still in need of improvement. The EPA has acknowledged that the lack of safe drinking water is among the top environmental challenges currently facing the CNMI, particularly Saipan. In a previous assessment, the EPA found Saipan to be the only municipality of its size in the United States without 24-hour water delivery. The agency reported that the distribution water on island flows through the pipes only a few hours each day for almost half of the island's residents and is largely undrinkable due to its high chloride content.

One important step in establishing 24-hour water delivery and improving water quality in the system is for the Commonwealth Utility Corporation (CUC) is to have a better understanding of how their distributions system delivers water to customers and what improvements are needed to meet operational and water quality goals. To assist in reaching their goals, the CUC commissioned The University of Guam Water and Environmental Research Institute of the Western Pacific (WERI) to develop a hydraulic model of the Saipan Water System and to train CUC water division staff in the use of that model.

In order to have a sound hydraulic model of the system it is necessary to have a good knowledge of the residential and commercial demands being placed on the distribution system. As mentioned by the US EPA above, much of the water system is not supplying water on a 24-hour basis and many of the customers have never been metered. At this point in time there is little knowledge on the usage rate values and how this usage is spatially distributed across the water system. Without this knowledge it is impossible to have a well calibrated hydraulic model of the water system.

This project proposes to better refine estimates of both the quantities and spatial distribution of water demands of both residential and commercial customers of the Saipan CUC water system. The specific objectives of this project are to:

1. Determine the average use rate for residential customers in Saipan and to determine the actual use rate for high commercial consumers such as laundromats and bottle water manufacturers.
2. Use Geographical Information System (GIS) techniques locate all residential and commercial customer locations in Saipan and assign appropriate use rates to the water system model junction that is closest to each customer location.
3. Export the data developed in Step 2 into the Saipan Water System hydraulic Model.

The resulting improvements to the demand estimates used in the existing water system model will provide the CUC water division with the capability to better identify what changes in operation and system improvements are required in order to meet the goals of improved water quality and 24-hour water delivery to all CUC customers.