



Improving the Weno, Chuuk Water Distribution System Using Hydraulic Modeling & Geographic Information Systems



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Water hours and low delivery pressure have long been a part of the daily lives of the people in the Micronesian Islands. The problems with delivery of adequate supplies of water to the customers at appropriate pressure have become more and more of a challenge to public utilities throughout these islands. Parts of these problems are due to phenomenal growth rate occurring in the island centers. This is particular true on the island of Weno in Chuuk State, Federated States of Micronesia (FSM).

Over the years the Chuuk Public Utility Commission's (CPUC) water distributions system has grown without adequate documentation as to the extent and size of supply and transmission resources and where these resources are located. Just at the turn of the century several new wells were added to the CPUC's water supply system. In 2003 and 2004 investigators from WERI gathered water quality information from all the existing wells and developed a preliminary map of the water delivery system. Since then many changes and additions have made to the delivery system.

This project will result in the development of a set of management and engineering tools, which the planning, operation, and engineering staff at CPUC can use to better plan, operate, and maintain the water delivery system. These tools will assist CPUC develop a water system that can deliver adequate water to all the households in Weno on a continuous basis with sufficient pressure. The first management tool that will be developed will be a computerized water system network model. This model will be developed using information gathered from previous studies

and additional information documenting changes and additions to the system since the original data was gathered. Other information such as system pressure and flows will be gathered as part of the calibration process of this model. The model will be available to the CPUC engineering and planning staffs to help in pinpointing problems areas and to explore operations options for improving system performance. The model will be developed using the free water distribution modeling program "EPANET".

The second tool will be a Geographic Information System based (GIS) inventory of system resources. This GIS system will describe the water sources available, the well systems in place, water storage facilities and major transmission lines in the distribution system. The GIS system will consist of maps showing the location of the various components of the water transmission system and ancillary equipment. The GIS will be available to managers and engineers so that they can explore various scenarios for long range planning for system maintenance and improvements. The GIS will also be available to the operations personnel so that they can maximize their resources for responding to emergencies, planning repairs, and purchasing the inventory of spare parts needed by the utility.