

Project

Greenfield Water Reclamation Facility: Process Technology Evaluation

Project Components

- Evaluation of Wastewater Characteristics
- Design Matrix for Process Technology Selection
- Lifecycle Cost Analysis
- Preliminary Design of Selected Technology

Background

The Greenfield Water Reclamation Plant (GWRP), located in Gilbert, Arizona and serving the City of Mesa, Town of Gilbert, and Town of Queen Creek, is currently rated as a 16-million gallon per day (MGD) annual average day flow (AADF) facility designed to consistently produce Class A+ reclaimed water while adequately handling the full range of variable flows and loads coming from each community's services areas. The plant is also a regional solids handling facility designed to produce Class B biosolids, with an additional 8 MGD AADF equivalent of primary sludge and waste activated sludge (WAS) from the City of Mesa's Southeast Water Reclamation Plant (SEWRP).

GWRP seeks to provide an additional 14 MGD AADF of liquids and solids treatment capacity to the existing facility to accommodate increased wastewater flows and loads, and reclaimed water demands in the tributary service area. This expansion shall increase the plant capacity to 30 MGD AADF of liquids treatment with an additional 8 MGD AADF equivalent of solids treatment. The plant shall continue to meet the Arizona Department of Environmental Quality (ADEQ) Class A+ reclaimed water standards in accordance with the facility's Aquifer Protection Permit (APP), and Class B biosolids in accordance with its near-term and long-term land application disposal strategies.

The existing GWRP employs a conventional activated sludge process with preliminary treatment (screening and grit removal), primary clarifiers, aeration basins with integral centrate and return activated sludge (RAS) reaeration basin (CaRRB) zone, secondary clarifiers, cloth disk media filters, and ultraviolet disinfection. The solids produced at the facility and the additional solids received from the SEWRP are treated using sludge thickening centrifuges, anaerobic digesters, and dewatering centrifuges. The reclaimed water is currently distributed from the GWRP Effluent Pump Station (EPS) to several locations, including the Gila River Indian Community (GRIC) receiving canal, the Town of Gilbert South Recharge Area and Gilbert Reclaimed Water Reservoir, and an emergency outlet at the East Maricopa Floodway (EMF).

Problem Statement

The project team shall evaluate the current treatment process and the historic wastewater characteristic data (flow, constituents, etc.) to determine what improvements can be made to meet the desired future treatment capacity. Emphasis shall be placed on optimizing the process for overall treatment efficiency including reductions in chemical and energy use. All proposed improvements shall be able to be implemented without disruptions to the current operation of the plant.

The project shall include the following components:

1. Analysis of historic flow and wastewater characteristic data to develop expansion design criteria (flow, peaking factors, concentrations, etc.).
2. Analysis of existing treatment process and proposed treatment alternatives.
3. Selection of desired treatment process/technology using a Decision Matrix which includes, at a minimum: feasibility/constructability, lifecycle costs, maintenance and operation requirements, process efficiency improvements, etc.
4. Final report that presents and discusses the following:
 - a. Determination of design criteria.
 - b. Analysis of existing treatment process.
 - c. Options for process improvement and optimization.
 - d. Evaluation and selection of proposed improvements.
 - e. How the proposed improvements will be implemented or constructed (phasing).

Additional Information to be Provided

1. GWRP Operation and Maintenance Manual Volume 1 & 2 (June 2008)
2. Wastewater Flow and Characteristic Data from 2006 to 2015.
3. Plant Energy Audit (April 2012)
4. GWRP Re-Rating Analysis (February 2012)