Water Supply Management through Water Reuse and Aquifer Replenishment

Rio Rancho, New Mexico

Client

City of Rio Rancho

Highlights

- Design, construction oversight, and permitting services for implementation of aquifer recharge systems
- Innovated advanced water treatment processing
- Extensive pilot testing and documentation of treatment system effectiveness
- Demonstrated surface infiltration and direct injection methods for safely replenishing underlying aquifer with reclaimed wastewater source
- Assisted with implementation of overall water management strategy

By 2060, the Middle Rio Grande region is expected to have a population equal to that of the current State of New Mexico: roughly 2 million. Innovative water supply alternatives, such as water reuse coupled with aquifer replenishment, are needed to support the City of Rio Rancho's projected growth within this water-limited region. Since 2006, DBS&A has worked closely with the City to develop all aspects of their water reuse, aquifer replenishment, and overall water supply management strategy.

DBS&A has demonstrated that surface infiltration and direct injection methods can be used to safely replenish the underlying aquifer with a purified, reclaimed water source. This includes instrumentation, monitoring, and reporting for a two-acre surface infiltration system which has the capacity to recharge the underlying aquifer present at a depth of nearly 500 feet below ground surface at a rate of 0.65 million gallons per day (mgd). DBS&A also designed, permitted, and developed a direct injection facility consisting of one deep injection well (16-inch casing to 1,700 feet), surrounded by an extensive groundwater monitoring network. The direct injection facility is capable of replenishing the groundwater system at a rate of 1 mgd, based on initial testing of the injection well with a potable water source.

Working with City staff, DBS&A obtained discharge permits through the New Mexico Environment Department and Underground Storage and Recovery permits from the New Mexico Office of the State Engineer for operation of the two aquifer recharge facilities. DBS&A fully evaluated treatment options to determine the best available technology that protects public health and the water resource through extensive pilot testing. Screening of treatment technologies ranged from physical separation through reverse osmosis membranes, advanced oxidation processes using ozone and hydrogen peroxide, adsorption processes (granular activated carbon [GAC] and biologically activated carbon [BAC]), and final disinfection.

Testing injection well capacity

Subsequent to pilot testing, DBS&A designed and is overseeing construction of the advanced water treatment facility that uses an ozone-based advanced oxidation process followed by a BAC-GAC step to reduce remaining wastewater-derived organics in the membrane bioreactor (MBR) effluent prior to direct injection within the regional aquifer. This process is used extensively for drinking water treatment and shows great potential for reclaimed waters when coupled with MBR systems. When using the direct injection method of recharge, the source water meets all drinking water quality standards to ensure that the groundwater supply is not impaired by chemicals or pathogens.