

Master Planning Recharge Facilities to Provide Flexibility for the Future

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ABSTRACT

Tucson Water relies heavily on recharge technologies to utilize its renewable water resources - Colorado River water and municipal effluent. The Utility has owned and operated large-scale recharge facilities for over 20 years and about 50% of potable water supply and up to 75% of reclaimed water supply is currently treated through recharge and recovery. One of the critical lessons learned over time is the need to consider uncertainty and future flexibility when developing recharge facilities.

In the recharge field, the primary design uncertainty is the recharge potential of the site under development. A thorough hydrogeologic investigation is key to managing this uncertainty. However, even the best investigative techniques can only provide an indication of the recharge potential for a site. The only way to truly determine what is practically possible is to put water into the ground. This requires significant capital investment and Utility managers need to have confidence that the decisions made during design do not preclude achieving the full potential of the facility.

To manage this risk at its planned facility that is currently under development, the Southern Avra Valley Storage and Recovery Project, Tucson Water has considered how flexibility can be built into the facility's conceptual master plan. Considerations have included: 1) Ensuring that the facility is designed to readily allow for expansion beyond the initial capacity targets; 2) Providing sufficient capacity in the raw water delivery infrastructure so that long-term goals can be met without having to redo previous work; and 3) Constructing the minimal initial recharge basin acreage to reduce the near-term capital cost while making provisions for additional basin acreage if/when needed based on actual facility performance.

These flexibility factors help manage both the initial and long-term costs of the facility by allowing the Utility to develop the site over time in a low-risk logical progression. Lessons learned from past decisions that did not consider future flexibility have helped shape how Tucson Water is planning its next large-scale facility.