

How Water Works

ILLUSTRATED PROCESSES, EQUIPMENT, AND TECHNOLOGY

Water Reuse Augments Sustainable Water Resources

Properly treated wastewater effluent, also known as “reclaimed water,” has been used for decades to meet nonpotable water needs. Specific requirements for implementing reclaimed water systems vary from location to location, but, generally, reclaimed water use for nonpotable water demand is an accepted practice.

More recently, interest has increased in the reuse of highly treated reclaimed water to augment potable water resources. A few projects have been implemented, and many others are being planned. As communities continue to stress current water supplies, water reclamation and reuse will play a greater role in water resource management.

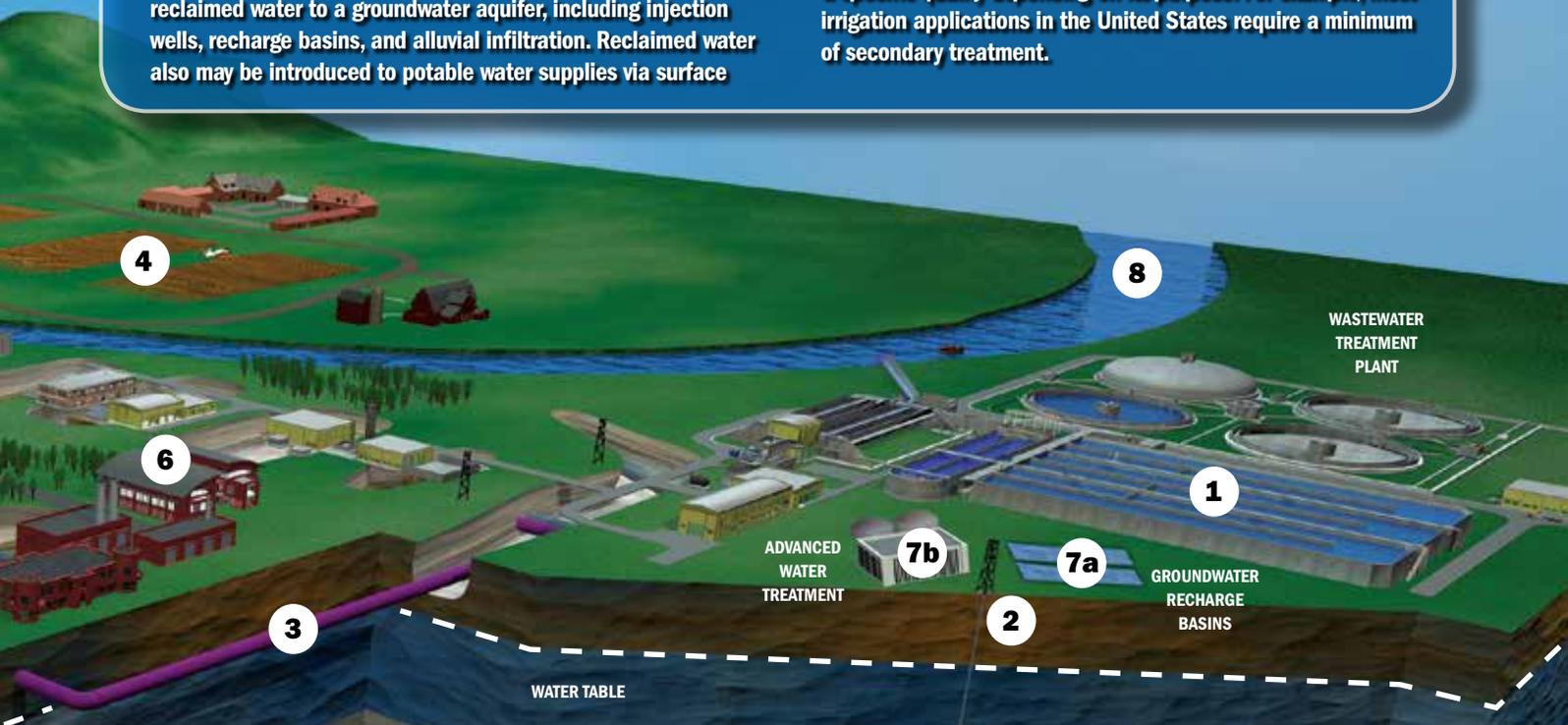


Some illustration elements exaggerated for emphasis.

1. Water-quality requirements for reclaimed water used to augment potable water resources may include limits to levels of pathogens, nutrients, trace organics, trace metals, total dissolved solids, and microconstituents. Following conventional preliminary, primary, and secondary treatment, processes typically used for producing reusable water include advanced treatment, natural treatment systems, and disinfection.
2. Several groundwater recharge methods can be used to add reclaimed water to a groundwater aquifer, including injection wells, recharge basins, and alluvial infiltration. Reclaimed water also may be introduced to potable water supplies via surface

water augmentation, in which reclaimed water is added directly to surface water supplies.

3. Reclaimed water pipelines must be identified clearly when they are manufactured and installed. The most common practice is to use purple-colored pipe.
4. Agricultural irrigation accounts for the largest use of reclaimed water. Although such nonpotable reuse isn't intended to be part of the potable water supply, nonpotable water may be treated to a specific quality depending on its purpose. For example, most irrigation applications in the United States require a minimum of secondary treatment.



5. Landscape irrigation is the second-largest use of reclaimed water in the United States, involving golf courses, parks, and other areas. Because public contact with the applied water is perceived as a potential health hazard, reclaimed water has to meet higher quality levels for suspended solids and microbial concentrations compared with some agricultural applications.
6. Major industrial users of reclaimed water are power plants, oil refineries, and manufacturing facilities where water is required principally for cooling purposes. Additional treatment may be necessary at the point of use, depending on water quality requirements for the specific industrial process.

7a and 7b. Increasing interest is focused on nontraditional water supply options to help water utilities diversify their water supplies, including indirect and direct potable reuse. Indirect potable reuse (7a) means that, after extensive treatment, the water spends time in an environmental buffer such as impoundment in a surface reservoir or infiltration or injection underground. The water may undergo additional treatment before entering the potable distribution system. Direct potable reuse (7b) eliminates the environmental buffer, relying on more robust and redundant treatment.

8. Downstream communities may use wastewater effluent as de facto (unplanned) reuse.

ILLUSTRATION: RON KNOWLTON