

## Section 7: REUSE

With the challenges associated with permitting surface water and the limited availability of groundwater, water reuse may be a viable option to extend limited, local water supply sources. Water reuse is the use of reclaimed water as a substitute for another generally higher quality water source. There are several types of reuse that may be used in the Metro Water District to extend supplies or replace potential new water sources with reuse water. Georgia EPD provided the Metro Water District with a goal to reuse 10% of the water withdrawn. This Section outlines the different types of water reuse as well as a discussion of existing and future applications in the Metro Water District identified to meet the 10% reuse goal.

### TYPES OF WATER REUSE

There are several types of water reuse that may be considered now or in the future by local water providers in the Metro Water District. To provide a common starting point for a discussion of reuse, Table 7-1 defines several common water reuse terms.

**TABLE 7-1**  
**Water Reuse Terminology**

Term	Definition
Reclaimed Water <sup>1</sup>	Wastewater that has received treatment to urban water reuse standards, meets the treatment criteria specified in Georgia EPD’s reuse guidelines, and is utilized at a reuse area or is sent to a designated user for reuse. Reclaimed water can include municipal wastewater, industrial wastewater, or treated effluent.
Water Reuse or Non-potable Reuse <sup>1</sup>	Use of reclaimed wastewater as a substitute for another generally higher quality water source. Reclaimed water can be reused for beneficial irrigation of areas that may be accessible to the public (such as golf courses, residential and commercial landscaping parks, athletic fields, roadway medians, and landscapes) and for other beneficial uses such as cooling towers, concrete mixing, car washes, etc.
Direct Potable Reuse <sup>2</sup>	The introduction of highly treated reclaimed water either directly into the potable water supply distribution system downstream of a water treatment plant, or into the raw water supply immediately upstream of a water treatment plant. This method of reuse incorporates no dilution or blending with other water sources.
Indirect Potable Reuse <sup>2</sup>	The planned incorporation of reclaimed water into a raw water supply such as in water storage reservoirs or a groundwater aquifer, resulting in mixing and assimilation, thus providing an environmental buffer.
Grey water	“Grey water” is defined as the wastewater produced from lavatories, bathtubs, showers, clothes washers and laundry trays. It does not include wastewater from water closets, kitchen sinks, photo lab sinks, dishwashers, or any other water deemed not appropriate for grey water systems.

Notes:

1. Georgia Comprehensive State-wide Water Management Plan, January 2008.

2. Water Reuse – Issues, Technologies, and Applications, Metcalf & Eddy, Inc., 2007

## **METRO WATER DISTRICT WATER REUSE ALTERNATIVES**

Of the water reuse categories listed in Table 7-1, only non-potable reuse and indirect potable reuse are recommended for the Metro Water District at this time. Direct potable reuse is not currently practiced in the United States, due to a lack of regulatory acceptance, public confidence with its safety and costs associated with implementing this type of reuse. Therefore, direct potable reuse is not being actively pursued for the Metro Water District at this time. Beyond 2035, both direct potable reuse and grey water may be considerations.

Water reuse in the Metro Water District offers a consistently available water supply to sustain existing sources. Treated municipal wastewater is a more reliable supply source than stormwater runoff or industrial discharges, because rain is intermittent and the treatment is not as significant. Despite these benefits, water reuse must consider public health, treatment process reliability, and carefully plan future infrastructure.

Non-potable and indirect potable reuse are both currently practiced in the Metro Water District and are expected to sustain water supplies into the future. Indirect potable reuse is highly encouraged, where appropriate. Non-potable reuse is acceptable depending on each local community's consumptive use challenges, when it offsets an existing potable water supply. The available applications and challenges of both non-potable reuse and indirect potable reuse are outlined below.

### **NON-POTABLE REUSE**

Non-potable reuse is currently practiced in the Metro Water District in the form of golf course irrigation, industrial process water, and other urban irrigation. Several local water providers in the Metro Water District with high irrigation demands have found that non-potable reuse can offset peak potable water demands.

Existing non-potable reuse applications in the Metro Water District generally belong to one of the following categories:

- Irrigation with secondary-treated effluent in restricted areas or land treatment of wastewater
- Irrigation with high quality treated effluent in unrestricted areas such as golf courses and parks

Although most of these non-potable reuse projects were developed to eliminate or reduce wastewater discharges, the reclaimed water from at least one treatment system recharges the potable water supply via soil percolation and constructed treatment wetlands. Non-potable reuse and land application of wastewater contribute to consumptive use of water as they have varying rates of returning water to the surface water source. Non-potable reuse that replaces surface water withdrawals is one way that this practice can be considered beneficial. Below is a listing of important factors for communities to consider related to non-potable reuse.

### Matching Supply and Demand

Successful programs require thorough planning to identify sufficient end-users of non-potable reuse water. Most of the irrigation users do not require water year-round, therefore storage or other uses of the water must be identified. Before initiating a non-potable reuse program, communities should develop a demand profile to assess the diurnal and seasonal variations in demand which may affect the infrastructure and storage size and location.

Providing irrigation water to golf courses can offset potable water usage and/or withdrawals from streams and groundwater, which is beneficial to the Metro Water District. Golf courses requesting increases in a water withdrawal permit or a new well permit should consider the use of reclaimed water for irrigation, when available from local wastewater providers.

### Infrastructure Requirements

Infrastructure needs for pipelines, pumping stations, and storage have a significant impact on the financial viability of reuse. Early adopters of non-potable reuse typically resulted from proximity to the water reclamation facility. Proximity of industrial users to the water reuse facility can also be a challenge for some communities as dedicated reuse pipelines may be prohibitively expensive.

### Economic Considerations

In addition to the infrastructure financial requirements, communities must consider the annual operations and maintenance costs of the additional treatment processes, distribution system, administration and other infrastructure. Non-potable reuse water rates should be structured so that they effectively support the capital investment in infrastructure as well as encourage conservation.

### Environmental Considerations

As irrigation water is not immediately returned to surface waters for use by the downstream contemporary user, the practice of non-potable reuse for irrigation must align with any established consumptive use targets. Non-potable water reuse must consider the need for instream flows during drought to protect instream habitat.

### Regulatory Considerations

Georgia EPD has established guidelines for non-potable reuse in the document: Water Reclamation and Urban Water Reuse, published in 2002. In addition to establishing water quality standards, requirements are placed on the reliability and redundancy for the reuse water treatment processes.

A summary of a few selected existing water reuse applications in the Metro Water District are presented below:

- The Cherokee Rose Creek Water Pollution Control Plant (WPCP), owned by the Cherokee County Water and Sewerage Authority (CCWSA), is permitted to discharge 2.5 MGD to either the Towne Lake Golf Course or Allatoona Lake.
- The Cauley Creek Water Reclamation Facility (WRF), located in North Fulton County, is privately owned by Cauley Creek Water Reclamation, LLC in a trust indenture relationship with

Fulton County. The current capacity of the WRF is 5 MGD. The water is distributed under pressure via two separate transmission pipelines that serve the Shakerag area of North Fulton County. The primary pipeline serves the 18-hole St. Ives and the 36-hole Atlanta Athletic Club golf courses. It could also be used to serve the Quail Hollow, Montclair, and St. Ives communities, due to the proximity of the pipeline to these developments. The pipeline is also serving the 18-hole Country Club of the South golf course, the 27-hole River Pines golf course, as well as the Standard Club. The second transmission pipeline, which is under construction, will extend northward along Bell Road and will provide reclaimed water to the Homestead and Shakerag communities as well as Technology Park, for landscape irrigation.

- The Johns Creek Environmental Campus, owned by Fulton County Department of Public Works is situated on 43 acres off Holcomb Bridge Road in the City of Roswell adjacent to the Chattahoochee River. Construction began in late 2006 and is anticipated to last approximately 40 months. The facility will replace the existing Johns Creek WRF and will have a total capacity of 15 MGD with an outfall to the adjacent Chattahoochee River as well as the capability to provide adjacent areas with non-potable reuse water.
- The Fowler WRF was commissioned as a design-build-operate facility by The Forsyth County Water and Sewer Department. Its current capacity is 2.5 MGD, with expansion capability to 7.5 MGD. It serves new communities in the Big Creek area north of Atlanta Road in Cumming. It will eventually receive flow from areas of South Forsyth County between Shiloh Road and McGinnis Ferry Road which is currently being treated by Fulton County. The treatment plant provides full urban water reuse quality water for irrigation, and has a 180-acre drip irrigation system at McGinnis Ferry Road for disposal of excess water. Through a 12-mile reuse pipeline (20-inch diameter), the WRF currently provides reuse water to a high school on Majors Road, Sharon Springs Park and St. Marlo's Country Club.

### INDIRECT POTABLE REUSE

For indirect potable reuse, discharge of reclaimed water to a lake or reservoir may be preferable to the discharge of water to a river or stream. Lake Lanier and Allatoona Lake are two likely choices for indirect potable reuse; Lake Lanier currently receives reclaimed water from several sources, including the City of Gainesville and Flowery Branch. Gwinnett County is also permitted to discharge to Lake Lanier but has not begun to return water to the Lake under this permit. Cobb and Cherokee Counties return reclaimed water to Allatoona Lake. Returning reclaimed water to these sources is an important means of sustaining water supplies for the Metro Water District and is an essential strategy for meeting water supply needs within the Metro Water District.

Planned indirect potable reuse to local supply sources within a community is encouraged throughout the Metro Water District as a means of sustaining water supplies. Returning reclaimed water to a local source can be more economical. Indirect potable reuse within a community provides necessary oversight of local water and wastewater treatment systems to assure high water quality. The Clayton County Water Authority is an example of a planned indirect potable reuse system that augments local water supplies. In cases where the return is made to one of the federal reservoirs, questions have arisen regarding how return flows should be credited. Georgia EPD has a number of permit requests in progress from Metro Water District water providers to institute planned indirect potable reuse. It is the position of the Metro Water District that such return flow should be fully credited to the entities making the returns.

### Water Quality Considerations

The viability of planned indirect potable reuse depends in part on the quality of the wastewater to be treated. Chemical and microbiological constituents that may be present in industrial wastewater may present challenges or adversely affect treatment processes. While industrial wastewater in the Metro Water District is not expected to limit indirect potable reuse, each community should analyze the potential impact.

### Regulatory Considerations

Georgia EPD is developing guidelines for planned indirect potable reuse that will address technology, and regulatory requirements that will have to be met in order for a community to develop a planned indirect potable reuse system.

### Public Acceptance Considerations

Educating the public on the benefits of indirect potable reuse and the multiple barrier approaches used to protect public health is an important regional challenge. The educational messages related to indirect potable reuse are a recommended element of the regional education and public awareness program, outlined in Section 12. The planned indirect potable reuse guidelines that Georgia EPD is developing will include public participation requirements.

Indirect potable reuse is already practiced in the Metro Water District, both in planned and incidental forms. Several major water supply intakes on the Chattahoochee River are currently located downstream of discharges from treatment facilities in Fulton and Gwinnett Counties. Examples of planned indirect potable reuse are found in Gwinnett, Cobb and Clayton Counties.

- Gwinnett County has constructed the 60-MGD Gwinnett F. Wayne Hill Water Resources Center, an indirect potable reuse facility. The facility treats wastewater to extremely stringent levels and returns it to the Chattahoochee River (20-MGD), where many downstream drinking water intakes exist. The treated effluent is transported 20 miles south, to a common outfall at the existing discharge location of the Gwinnett Crooked Creek WRF. This pipeline provides an opportunity for major water users (such as the Mall of Georgia) along the pipeline route to use the highly treated effluent for irrigation. Ultimately, Gwinnett will also return water to Lake Lanier (40-MGD), a primary source of drinking water for the Metro Water District.
- The Cobb Northwest Cobb WRF near Kennesaw is permitted to discharge 8 MGD to Allatoona Lake and 2 MGD to Cobblestone Golf Course for irrigation purposes. The treatment plant provides advanced nitrogen and phosphorus removal, filtration and ultraviolet disinfection ahead of its discharge to Allatoona Lake, the major water supply for West Cobb, Bartow, Paulding and Cherokee Counties.
- Noonday Creek WRF, also in northwest Cobb County, has a capacity of 12 MGD and has biological phosphorus removal, filtration and ultraviolet disinfection. The plant discharges to Noonday Creek, which is a tributary of Allatoona Lake.
- Clayton County Water Authority (CCWA) currently practices indirect potable reuse at two water reclamation facilities, W.B. Casey and Shoal Creek, which discharge high quality effluent into constructed treatment wetlands for natural treatment prior to discharge into CCWA drinking water supply watersheds. The CCWA indirect potable reuse system utilizes the multiple barrier approach seen in most other systems, but also provides two extra barriers through the

constructed treatment wetlands and UV disinfection of potable water. During the 2007 drought, these two systems contributed to CCWA water reserves, which were maintained at or above 77% of full capacity. The W.B. Casey WRF facility provides advanced secondary level treatment for 24 MGD, of which 9.3 MGD of this treated effluent is currently pumped to the E.L. Huie Jr. constructed treatment wetlands. The Huie wetland discharges to the Pates Creek watershed containing both the Shamrock and the Blalock reservoirs. Construction of an additional 8.2 MGD of wetland cells will bring the total treatment capacity to 17.5 MGD in 2009. The Shoal Creek WRF provides advanced secondary treatment with UV disinfection to 4.4 MGD with an average of 1.4 MGD of treated effluent being pumped to the Panhandle constructed treatment wetlands. The Panhandle wetland discharges to the Shoal Creek watershed containing both the Shoal Creek and the J.W. Smith reservoirs.

- The City of Gainesville supplies drinking water to the City and Hall County with water withdrawn from Lake Lanier and treated at the City's Lakeside and Riverside Water Treatment Plants. Wastewater is treated to advanced levels and discharged back to Lake Lanier, in support of regional and state objectives for water reclamation and reuse. Two Water Reclamation Facilities, Flat Creek WRF and Linwood WRF, perform advanced treatment and disinfection using ultraviolet radiation to protect Lake Lanier water quality. The newly rebuilt Linwood WRF was dedicated in 2008, and uses membrane technology to enhance nutrient removal and indirect potable reuse of the reclaimed water.

## REUSE DEMAND ESTIMATES

The Metro Water District reuse demands were estimated using the Least Cost Planning Decision Support System (DSS) Model and methodologies discussed in Sections 3 and 4 of this report. These planning level estimates provide an estimate of the possibilities for reuse in the Metro Water District. The Wastewater Plan shows in Section 2 that 16% of the wastewater treated in the Metro Water District is reuse water, either non-potable or planned or incidental indirect potable reuse. Within the planning horizon, that percentage is expected to increase to 26% of wastewater treated in the Metro Water District. This Section includes an estimate based on the DSS model of potential for reuse but is not intended to guarantee that level of reuse. Based on the planning considerations, local water and wastewater providers should analyze the potential based on local master plans for implementing reuse.

### NON-POTABLE REUSE DEMAND ESTIMATES

Urban irrigation demand, also known as non-residential irrigation demand, was estimated for the Metro Water District. Not all of the urban irrigation demand can be met through non-potable reuse due to a number of factors, including proximity to a reuse corridor, the use of private irrigation facilities (such as small lakes or groundwater wells), or the small size of some parks or open spaces that can make the cost of infrastructure prohibitive. The 2035 urban irrigation demand that could potentially be supplied by non-potable reuse was estimated to be 50 AAD-MGD.

Most parks and golf courses are only irrigated in the spring and summer months, as the irrigation demand is usually very low during winter months. Replacing potable water with reclaimed water for urban irrigation would have a small, but positive impact on demand reduction, especially during peak demand months. Because of the generally abundant rainfall in the region, demand reduction through urban irrigation is best treated as a way to lower potable water use during peak

demand months, thereby conserving potable water for other types of consumption. In some instances, surface water discharge permits during off peak months may be combined with reuse where sufficient storage is not viable during times when reuse water demand is low.

For non-potable reuse to be beneficial it needs to replace (i.e., conserve) potable water use and work within the framework of local consumptive use targets. If additional irrigation water demand is created by the presence of an inexpensive non-potable reuse water supply, then not all reuse water will be replacing potable water demand. It should also be noted that during drought periods, irrigation bans are the first water conservation measure to be undertaken by many Metro Water District municipalities. This means that reuse for irrigation in such a period would not be replacing potable water use.

Industrial demand for reclaimed water was also estimated. Industrial demands include potable water use, as well as process water use at industrial customer locations. In order to estimate the portion of the total industrial water demand that could be met through reclaimed water, data from the 2003 Water Supply and Water Conservation Management Plan was used. The industries assessed represented a wide variety of process types. Based on this information, the 2035 industrial potential for reclaimed water was estimated to be 10 AAD-MGD. This reuse potential may not be achieved due to siting and water quality constraints at many industrial facilities.

### INDIRECT POTABLE REUSE ESTIMATES

Potential indirect potable reuse quantities were estimated by considering the amount of wastewater discharged, required minimum instream flow requirements, and downstream water withdrawals. Based on preliminary calculations, the amount of reclaimed water available for planned indirect potable reuse could range from 40 AAD-MGD to 125 AAD-MGD, or 4 to 12 percent of the projected 2035 demand for the Metro Water District. The Georgia EPD has imposed limits on the amount of indirect potable reuse that Lake Lanier can accept. The current limit is 92 MGD on a maximum monthly basis, with a phosphorus level of 0.13 milligrams per liter (mg/L). If the quantity of indirect potable reuse to Lake Lanier exceeds 120 MGD, the cost of treating to the necessary nutrient limit may become prohibitively expensive.

Returning reclaimed water to local water supply sources was estimated for 2035 based on information from local water providers. The potential exists for up to 100 AAD-MGD of planned indirect potable reuse to occur at local water supply sources. The feasibility and cost of implementing indirect potable reuse will be dependent on phosphorus and regulatory limits as well as raw water quality in the reservoirs or receiving streams.

## ACTION ITEM 7.1 – RETURN RECLAIMED WATER TO LAKE LANIER AND ALLATOONA LAKE FOR FUTURE INDIRECT POTABLE REUSE

### ACTION ITEM

Return reclaimed water to Lake Lanier and Allatoona Lake for future indirect potable reuse.

### OBJECTIVE

The objective of this measure is to sustain water supplies in Lake Lanier and Allatoona Lake through the implementation of indirect potable reuse.

### DESCRIPTION OF MEASURE

Long-term sustainability of the resource can be achieved through returning reclaimed water to Lakes Lanier and Allatoona. The Metro Water District should negotiate with the Corps to provide a storage credit to permitted withdrawers for returning the reclaimed indirect potable reuse water to the Lakes.

The cities and counties that withdraw water from Lake Lanier for drinking water supply should maximize the return of reclaimed water to the Lake. Gwinnett and Hall Counties have the treatment infrastructure in place to return highly treated wastewater to Lake Lanier. Gwinnett County has a discharge permit to Lake Lanier and estimates returning reclaimed water to Lake Lanier by the end of 2009. At this time, Gainesville and Flowery Branch are currently returning reclaimed water to the Lake via discharges to tributaries. Forsyth County and the City of Cumming have plans to build water reclamation facilities to return flow to Lake Lanier by 2015.

The cities and counties that withdraw water from Allatoona Lake for drinking water supply should maximize the return of reclaimed water to the Lake. Cherokee and Cobb Counties return reclaimed water to Allatoona Lake directly and via tributary streams of the Lake. Cartersville in Bartow County also returns reclaimed water to Allatoona Lake via tributary streams.

Summing both planned and incidental indirect potable reuse, communities currently plan to return over 100 AAD-MGD to Lake Lanier and approximately 36 AAD-MGD to Allatoona Lake as outlined in the Wastewater Management Plan within the 2035 planning horizon.

<b>Responsible Party</b>
<input checked="" type="checkbox"/> Local Water Provider
<input type="checkbox"/> Other: _____
<b>In Coordination With</b>
<input type="checkbox"/> Site Plan Review Staff
<input checked="" type="checkbox"/> Community Development/ Zoning
<input checked="" type="checkbox"/> Neighboring Local Water Providers (where appropriate)
<input type="checkbox"/> Georgia EPD
<input checked="" type="checkbox"/> Other: <u>Metro Water District, USACE</u>

## **CONCLUSIONS**

Water reuse is an important component of the overall water supply strategy to sustain water resources. Non-potable reuse is acceptable depending on local consumptive use challenges when it offsets existing potable demands. Reuse potential in the Metro Water District has the potential to play a significant role within the 2035 planning horizon, with estimates of providing 8 to 20% of the total water supply. Beyond the 2035 planning horizon, it is anticipated that to sustain water supplies within the Metro Water District, reuse and more specifically indirect potable reuse in conjunction with the aggressive water conservation program will be needed to meet water demands.

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