

### **5A.3 Wastewater Reuse**

#### **5A.3.1 Description of Option**

Wastewater Reuse would be defined as the types of projects that utilize treated wastewater effluent as a replacement for potable water supply, reducing the overall demand for fresh water supply. Wastewater Reuse typically involves a capital project connecting the treatment plant discharge facilities to an individual area that has a relatively high, localized use that can be met with non-potable water. Examples most frequently include the irrigation of golf courses and other public lands and specific industries or industrial use areas. Few, if any, entities would be capable of utilizing their entire effluent capacity for reuse. Downstream needs, both water rights and environmental instream uses, would have to be met. Any remaining flows after these needs are met could potentially be utilized. Virtually any water supply entity with a wastewater treatment plant could pursue a reuse alternative, provided that downstream water rights do not have a claim for the entire return flow. Current examples of existing reuse systems in the Brazos G region include those of the cities of Abilene, Stephenville, and Cleburne. Many other smaller communities make their effluent available for irrigation purposes.

#### **5A.3.2 Available Supply**

The water supply reductions that would be potentially available for any entity would be that portion of their wastewater effluent stream that is over and above the downstream water rights and environmental instream requirements for the water body into which the effluent is discharged. Of this potential, the amount that can actually be recognized depends on the availability of suitable uses within an economical distance from the treatment plant. If individual high water use industrial plants or open land that benefits from irrigation, such as golf courses, are located relatively close to the plant, then reuse can provide a substantial benefit to the overall supply program.

In order to isolate those communities that may have potential benefits from a reuse program, information regarding each of the communities with both a projected deficit and a wastewater treatment plant was gathered. Table 5A.3-1 lists these communities, their projected deficits, approximations of average effluent, and an assumed portion of the effluent that may be recoverable, estimated as 25 percent of the average effluent. The difference between the potential supply and any existing reuse would be considered the amount available.



The cities of Bryan and Sweetwater show a potential reuse amount greater than the projected deficit and could possibly meet their deficit in this manner. Three smaller communities, Comanche, DeLeon, and Haskell, also show a potential reuse amount greater than the projected supply. However, for the smaller communities, the general cost assumptions may not apply and each would have to study whether a potential use for the wastewater effluent exists within an economical distance from the treatment plant.

These values, however, are estimates based on general assumptions and regional approximations. Individual communities would need to study the individual circumstances, including potential users of the effluent, their proximity to the treatment plant, and the costs of supplying the treated water in order to determine their specific reuse potential.

### **5A.3.3 Environmental Issues**

Environmental impacts could include:

- Possible low impact on instream flows below discharge points due to reduced effluent return flow rates;
- Possible increased water quality to remaining stream flows; and
- Possible high negative impact to fish and wildlife habitat with substantially reduced stream flows.

A summary of environmental issues is presented in Table 5A.3-2.

### **5A.3.4 Engineering and Costing**

A review was made of existing reuse systems to determine an approximate unit cost for the appropriate reduction in demand from the utilization of treated wastewater effluent. The results of this review were compared with approximations for various potential sizes of facilities for municipalities in the region. On average, for general planning purposes, wastewater reuse should cost about \$1.00 per 1,000 gallons of potable supply reduction, or \$326 per acft. These estimates are very rough and will vary significantly depending on the circumstances of the individual community. These costs do not include purchase of the reclaimed wastewater, which may be necessary in order to obtain water from the wastewater utility. Previous studies<sup>1</sup> of wastewater reuse as a water supply indicate that about 90 percent of the unit cost of the project is

<sup>1</sup> HDR Engineering, Inc., "Trans-Texas Water Program, North Central Study Area, Phase II Report," 1998.

**Table 5A.3-2.  
Environmental Issues: Wastewater Reuse**

Water Management Option	Wastewater Reuse
Implementation Measures	Development of additional wastewater treatment plant facilities, distribution pipelines, and pump stations
Environmental Water Needs / Instream Flows	Possible low impact on in-stream flows due to decreased effluent return flows; possible increased water quality to remaining stream flows
Bays and Estuaries	Possible low negative impact
Fish and Wildlife Habitat	Possible variable impacts depending on changes in volume of effluent return flows; possible high negative impact to fish and wildlife habitat with substantially reduced stream flows
Cultural Resources	Possible low impact
Threatened and Endangered Species	Negligible impact
Comments	Assumes needed infrastructure will be in urbanized areas

debt service paying off the total project cost. The remaining 10 percent of the unit cost is for operations, maintenance, and electrical costs.

### **5A.3.5 Implementation Issues**

This water supply option has been compared to the plan development criteria, as shown in Table 5A.3-3, and the option meets each criterion.

Each community that pursues wastewater reuse will need to investigate each of the concerns already described. These would include at a minimum:

- Amount of treated effluent available, taking into consideration downstream water rights and environmental instream needs.
- Potential users, primarily individual large-scale users that could utilize non-potable water (e.g., certain industries) and irrigated lands (e.g., golf courses and park areas).
- Capital costs of constructing needed distribution systems connecting the treatment facilities to the areas of reuse.

Reuse of reclaimed wastewater requires a TNRCC permit. Requirements specific to pipelines needed to link wastewater treatment facilities to reclaimed water users may include:

- U.S. Army Corps of Engineers Section 404 permit(s) for pipeline stream crossings; discharges of fill into wetlands and waters of the United States for construction; and other activities;
- NPDES Storm Water Pollution Prevention Plan; and
- TPWD Sand, Shell, Gravel and Marl permit for construction in state-owned streambeds.

**Table 5A.3-3.  
Comparison of Wastewater Reuse Option to Plan Development Criteria**

<b>Impact Category</b>	<b>Comment(s)</b>
A. Water Supply: 1. Quantity 2. Reliability 3. Cost	1. Potentially important source, up to 25% of demand 2. Highly Reliable 3. Reasonable
B. Environmental factors 1. Environmental Water Needs 2. Habitat 3. Cultural Resources 4. Bays and Estuaries	1. Reduces instream flows—low to moderate impact 2. Possible low impact 3. None or low impact 4. None or low impact
C. Impact on Other State Water Resources	<ul style="list-style-type: none"> <li>No apparent negative impacts on state water resources; benefit accrues to demand centers by more efficient use of available water supplies; no effect on navigation</li> </ul>
D. Threats to Agriculture and Natural Resources	<ul style="list-style-type: none"> <li>Generally positive effect to agriculture and natural resources by avoiding need for new supplies</li> </ul>
E. Equitable Comparison of Strategies Deemed Feasible	<ul style="list-style-type: none"> <li>Option is considered to meet municipal and industrial shortages</li> </ul>
F. Requirements for Interbasin Transfers	<ul style="list-style-type: none"> <li>Not applicable</li> </ul>
G. Third Party Social and Economic Impacts from Voluntary Redistribution	<ul style="list-style-type: none"> <li>Could offset the need for voluntary redistribution of other supplies</li> </ul>

### **Mitigation Funding and Other**

Mitigation requirements would vary depending on impacts, but could include vegetation restoration, wetland creation or enhancement, or additional land acquisition.