Tampa Bay Regional Reclaimed Water & Downstream Augmentation Project

A Regional Partnership

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The Tampa Bay region is currently home to more than 2.5 million people and is faced with significant water resource concerns. The watershed of the Hillsborough River is the source of much of the region's potable water supply. Land use changes with associated drainage and storage alterations, a regional flood project, and ground and surface-water withdrawals have contributed to a strain on water resources.

The existing water supply infrastructure is adequate to serve the population over the near term, but new, environmentally sustainable water supplies must be developed to protect the area's natural resources. The Tampa Bay Regional Reclaimed Water and Downstream Augmentation Project is a regional partnership that will use reclaimed water to help meet future demands, while ensuring the sustainability of environmental resources.

The city of Tampa owns and operates the Howard F. Curren Advanced Wastewater Treatment Plant, serving Tampa and portions of Hillsborough County and the city of Temple Terrace. The effluent from the Curren Plant surpasses reclaimed water standards. From 1997 through 2001, the average flow treated was about 53 million gallons per day (mgd), varying from an annual low of 49 mgd to a high of 62 mgd. The average flow in fiscal year 2003 was 61 mgd. Historically, most of the highly treated effluent has been discharged to Hillsborough Bay, except for about 0.5 mgd that is used by the city's resource recovery facility.

While Tampa was realizing a surplus of reclaimed water, other local utilities were experiencing a shortage. Thus, Tampa needed others to share in the cost of the infrastructure to deliver this additional supply to the utilities that needed it as a potable water offset.

An innovative partnership to maximize the beneficial use of reclaimed water in the Tampa Bay area was formed by Tampa, Hillsborough and Pasco counties, Tampa Bay Water (the local regional water supply authority), and the Southwest Florida Water Management District (SWFWMD), which has coordinated the partnership and committed resources to advance the project.

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The partnership proposes to utilize reclaimed water produced at the Curren Plant and water reclamation facilities in Hillsborough and Pasco counties, maximizing its beneficial use in the Hillsborough and Palm River watersheds to reduce demand for drinking water and increase surface water availability. The arrange-

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ment affords Tampa and the two counties an adequate supply of reclaimed water to expand their irrigation service base by leveraging the available reclaimed water supply. Tampa Bay Water will also use the reclaimed water from the Curren Plant for downstream augmentation of a local river and canal in exchange for increased upstream withdrawals for potable use.

The estimated potable water savings of all components proposed under the core regional reclaimed water project is up to 26 mgd. This core project will allow service to up to 30,000 additional reclaimed water customers and includes five key components:

- Addition of residential and commercial reclaimed water customers by the city of Tampa and Hillsborough and Pasco Counties.
- Stream augmentation by Tampa Bay Water allowing freshwater withdrawals upstream as a potable water source.
- Maintenance of the regulated minimum flow in the Hillsborough River by the city of Tampa.
- Enhancement of natural systems and aquifer recharge in southeastern Pasco County by the SWFWMD.
- Natural systems enhancement, aquifer recharge, and storage in southern Hillsborough County, by Hillsborough County.

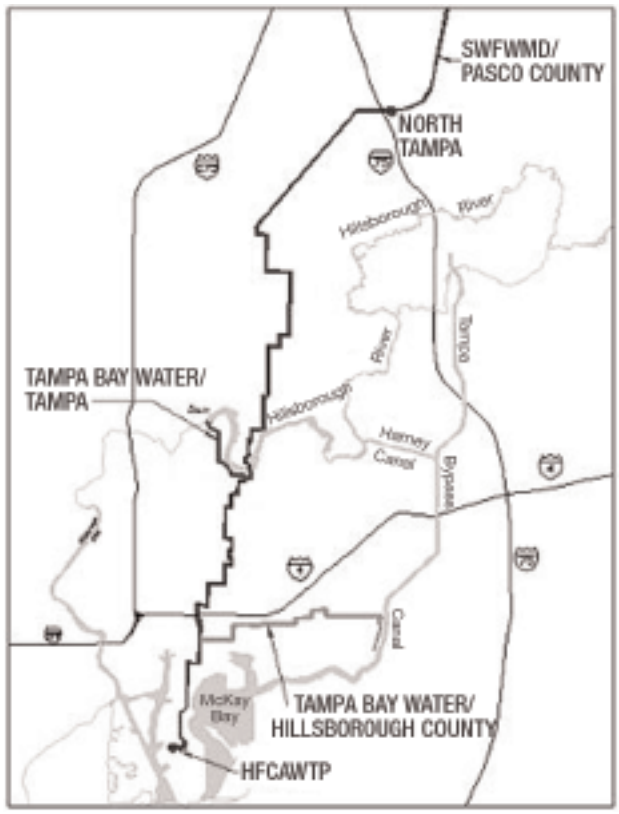

Figure 1 – Northern Transmission System

The Main Artery

To implement the components of the project, the Northern Transmission System, shown in **Figure 1**, is the main artery of the system. Those partners utilizing reclaimed water for irrigation will need to extend existing infrastructure to provide reclaimed water service to additional irrigation users.

The Northern Transmission System is essential for implementation of all the proposed regional projects.

The Purpose

The Tampa Bay Reclaimed Water and Downstream Augmentation Project will allow Tampa and the two counties to add residential and commercial reclaimed water customers, significantly increasing the percentage of reclaimed water from each utility that is beneficially reused. Also, Tampa Bay Water will be able to meet the drinking water supply

needs of the region through 2017. The project is proposed to allow the partners to:

(1) Provide an estimated 13 mgd of drinking water supply to the region through exchange of reclaimed water downstream for upstream surface water.
(2) Offset potable water demands with reclaimed water usage for irrigation and other purposes.
(3) Beneficially use reclaimed water.
(4) Maintain minimum flows and the natural water-dependent systems in the local watersheds.

In addition, the Project will reduce nitrogen loading to Tampa Bay.

Lower irrigation demands in the wet season provide a surplus for other beneficial uses.

The project provides dry-season and wet-season uses of reclaimed water produced at the Curren Plant. In addition to the core components, additional wet-season uses for reclaimed water are being considered. Irrigation demands are seasonal, with peak demand occurring typically during the drier months of April and May. Wet-season irrigation demands are relatively low, which results in reclaimed water being available during those months. Three potential wet-weather projects include:

- Large-scale storage and/or aquifer recharge using reclaimed water in the Southern Water Use Caution Area, (SWUCA) for later use by reclaimed water customers in Hillsborough County.
- Large-scale storage and/or aquifer recharge using reclaimed water for later use by reclaimed water customers in Pasco County.
- Use of reclaimed water for natural system enhancement in the Upper Hillsborough River Watershed.

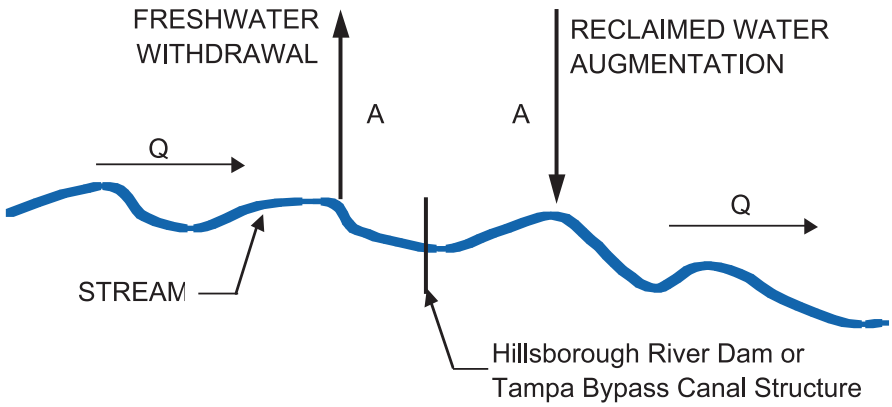

Figure 2 – Downstream Augmentation Concept

The purpose of the two large-scale storage/aquifer recharge projects would be to move toward 100-percent reuse of reclaimed water produced in Pasco County and southern Hillsborough County, significantly lowering potable water demands. The other wet-weather option would enhance natural systems during seasons when irrigation demands are low and a surplus is available.

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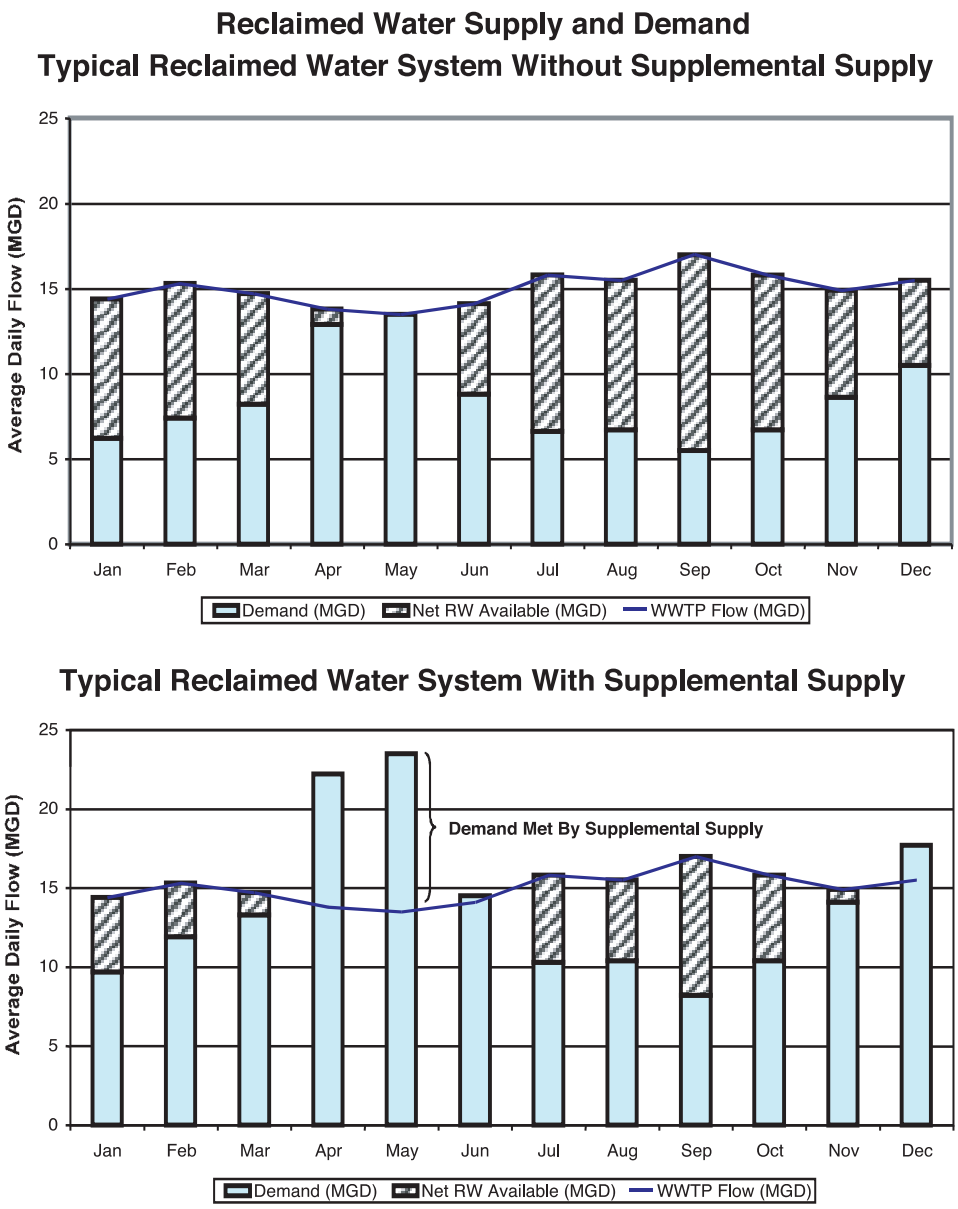

Figure 3

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The Project is the first within the SWFWMD with the defined intention to maximize the beneficial use of both wet- and dry-season reclaimed water flows.

The Project

The project proposes the following dry-season utilization of the reclaimed water supply:

City of Tampa

The city, in collaboration with the SWFWMD, is currently developing the South Tampa Area Reuse (STAR) project to provide reclaimed water to residents in the South Tampa area. Phase I is operational and studies have been completed for Phase II.

It is estimated that the near-term (about 10 years) maximum STAR demand will be about 9 mgd in the dry season. Thus, the committed uses of reclaimed water from the city during the dry season, including Phase I and II of STAR and the resource recovery facility, approach 10 mgd.

The project would expand Tampa's reclaimed water supply to the North Tampa area to serve largely residential customers. The projected near-term, dry-season reclaimed water demand for the resource recovery facility, STAR, and North Tampa is an estimated 23.5 mgd. In addition, the city would use 6.5 mgd of reclaimed water during the dry season to augment the Hillsborough River flow below the dam. Subtracting the total of all city demands from the total dry-season plant flow means that up to 18 mgd could be available for other regional dry-season uses.

Hillsborough County

The county would receive 7 mgd or more of reclaimed water to help serve irrigation demands and also to serve additional residential and industrial customers, while beneficially using a greater percentage of reclaimed water produced by the county.

Pasco County

The county would receive up to 10 mgd of reclaimed water to help serve irrigation demands and to serve additional customers, while beneficially using a greater percentage of reclaimed water produced by the county.

The project to provide additional potable water to the region is as follows:

Tampa Bay Water

Tampa Bay Water could receive reclaimed water to augment flows in the Hillsborough River and the Tampa Bypass Canal. The reclaimed water would be separated from the drinking-water source by Tampa's dam on the Hillsborough River and a concrete control structure on the Tampa Bypass Canal, as shown in **Figure 2**.

The source of the surplus reclaimed water would be the Curren Plant. By augmenting stream flows downstream, additional fresh water can be withdrawn upstream. ***The reclaimed water would be used to replace fresh water and would not be used as a potable water source.*** This project would allow Tampa Bay Water to withdraw more fresh water for potable water treatment, as allowed by its water use permit, while high-quality reclaimed water is discharged downstream to maintain the flows in the streams.

Reclaimed water will typically be available for uses other than irrigation during as much as 10 months of the year.

Projects proposed for the times when surplus reclaimed water is available are:

Hillsborough County

The county proposes to create the first reclaimed water system in the U.S. to beneficially use 100 percent of its reclaimed water resource by incorporating a wet-season storage project on an abandoned, unreclaimed phosphate mining facility that would combine a reservoir, aquifer storage/recharge, natural systems enhancements, and treatment. This component of the project will allow the

county to serve additional reclaimed water customers while replacing reclaimed water for groundwater for users in the stressed SWUCA. Use of reclaimed water by coastal counties is the major source of water recommended by the SWFWMD in its SWUCA Recovery Plan.

SWFWMD

The SWFWMD would utilize surplus reclaimed water in the wet season for various uses in southeastern Pasco County, including wetlands creation or enhancement and land application. The key feature of this component is the recharge of groundwater in the Upper Hillsborough River Watershed that will result from these projects. The system created will return highly treated surplus reclaimed water to the area of its origin as part of an innovative, comprehensive watershed management approach.

This project component can be accomplished in two parts. The first part, which is included in the core project, involves limited additional infrastructure and would return up to 6.0 mgd to the watershed annually. The second part is an enhancement to the project and would return up to an additional 6.0 mgd annually to the watershed.

The Reclaimed Water Supply

The typical relationship between the supply of reclaimed water available and the reclaimed water demand is shown in Figure 3. The top graphic in the figure shows the typical relationship where a supplemental source of reclaimed water is not available. In that case, the limiting factor for service to additional customers is the supply and demand for reclaimed water during the dry season, during which all reclaimed water produced at a typical water reclamation facility could be utilized.

The bottom graphic in **Figure 3** shows the same typical relationship where supplemental reclaimed water from the city of Tampa is available, allowing Hillsborough and Pasco counties to serve additional customers and to use a greater percentage of reclaimed water produced at their water reclamation facilities. The additional reclaimed water that the counties would receive in the dry season allows them to serve from 30 to 60 percent more customers. The chart at the top of page 69 shows the increased reuse for each county resulting from the leveraging of reclaimed water.

The difference between the additional reclaimed water supplied and the reclaimed water from the city of Tampa is the additional quantity of reclaimed water that each county can supply from its own reclaimed water facilities due to its expanded customer base made possible from added seasonal storage and the availability of reclaimed water during the dry season from Tampa.

County	Maximum Daily Supply Provided by Tampa (MGD)	Annual Average Reclaimed Water from Tampa (MGD)	Additional Annual Average Reclaimed Water Supplied to County Customers (MGD)
Hillsborough	7.0	2 – 3	3 – 6
Pasco	10.0	2 – 4	4 – 6

It is important to note that:

- ***Dry-season demands for reclaimed water should not conflict with proposed wet-season uses.***
- ***Each county will be able to draw upon the resource available from Tampa up to the maximum daily flow whenever it needs the reclaimed water.***

Figure 4 shows the potential water balance at the Curren Plant after implementation of the dry-weather reclaimed water projects for a representative three-year period. Essentially all reclaimed water would be used in April and May, but the graphic also shows that there is reclaimed water available during other times of the year. The available supply allows other project components to operate during other seasons of the year.

The Cost and Benefit

It has been demonstrated that the project would provide a cost-effective source of potable water through offsets. Final cost estimates are currently being developed for each project component.

Project costs will be equitably shared among the regional partners.

In the near term (10 years), the core project will offset up to 26 mgd of potable water. This offset may increase over time as additional reclaimed water flow develops. The project will also provide additional aquifer recharge and natural system enhancement.

An offset occurs when reclaimed water can be utilized for other purposes in lieu of potable water. It is estimated that the potable water offset for irrigation projects will be approximately 60 percent of the reclaimed water demand. Maintaining minimum flow at the Hillsborough River Dam and the downstream augmentation component of the project will create an offset of one to one (for every gallon of downstream augmentation, one gallon of upstream surface water is made available for potable water supply).

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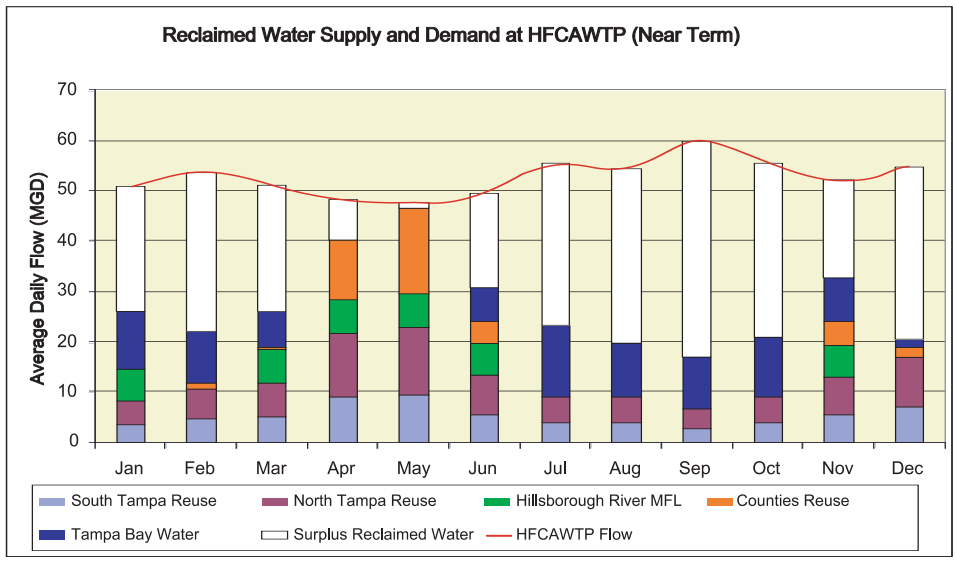

Figure 4

City or County	Residential Reclaimed Water Customers Served
Tampa	13,000
Hillsborough (due to supplemental water obtained from Tampa)	7,000
Pasco (due supplemental water obtained from Tampa)	10,000
Total for Core Project	30,000

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The proposed component for natural system enhancement and aquifer recharge has the initial potential for up to 11 mgd in water resource benefit as part of the core project. Additional benefits may be achieved in subsequent phases.

The wet-season projects provide the potential for additional water resource benefits. The Hillsborough SWUCA Restoration Project has the potential to provide additional potable water offsets. The project component for further watershed enhancements in southeastern Pasco County also offers additional water resource benefits for the watershed in addition to the core project.

The reclaimed water supplied by Tampa through the various components of the core project allows Hillsborough and Pasco counties to leverage the reclaimed water produced at their own facilities throughout the year to serve the number of residential reclaimed water customers shown in the chart on this page.

In addition, the project will provide service to non-residential customers in Tampa and the two counties. Future expansion of Tampa's reclaimed water system could add 10,000 additional residential customers as the reclaimed water resource becomes available.

The Next Steps

The timeline for completion of the core project is approximately 10 years. The components are in a conceptual stage and include various levels of development on how each component will be implemented, how it fits into the overall project, and how costs will be shared among the proposed partners. Each regional partner is currently analyzing the feasibility of the various components, and a master agreement is being negotiated among the partners.

Several steps are required to further develop the project. The next steps that must be initiated by the regional partners include:

- Further refine supply and demand quantities for reclaimed water.
- Perform a detailed feasibility analysis on each component.
- Complete cost allocation and funding agreements.
- Continue to seek funding (federal, state, and local).
- Accomplish permitting and final design.
- Make the final decision to construct.
- Create an operations plan to determine how the resources would be operated daily.

Acknowledgment

Information presented herein was developed with the assistance of the city of Tampa, Hillsborough County, Pasco County, Tampa Bay Water, and the Southwest Florida Water Management District.