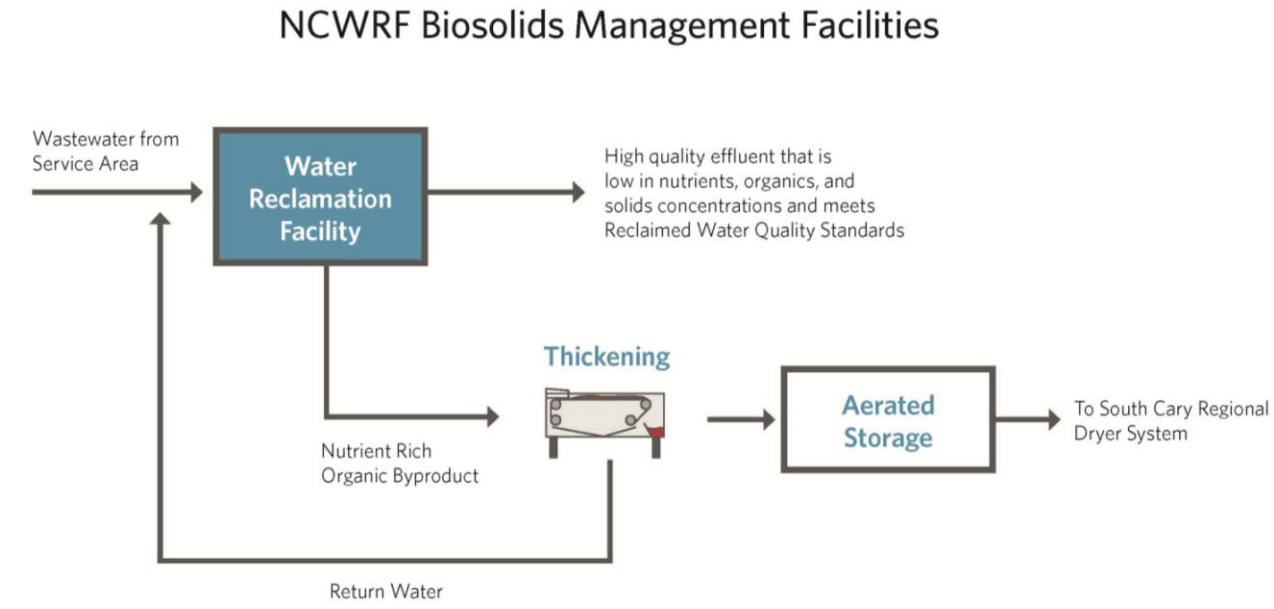
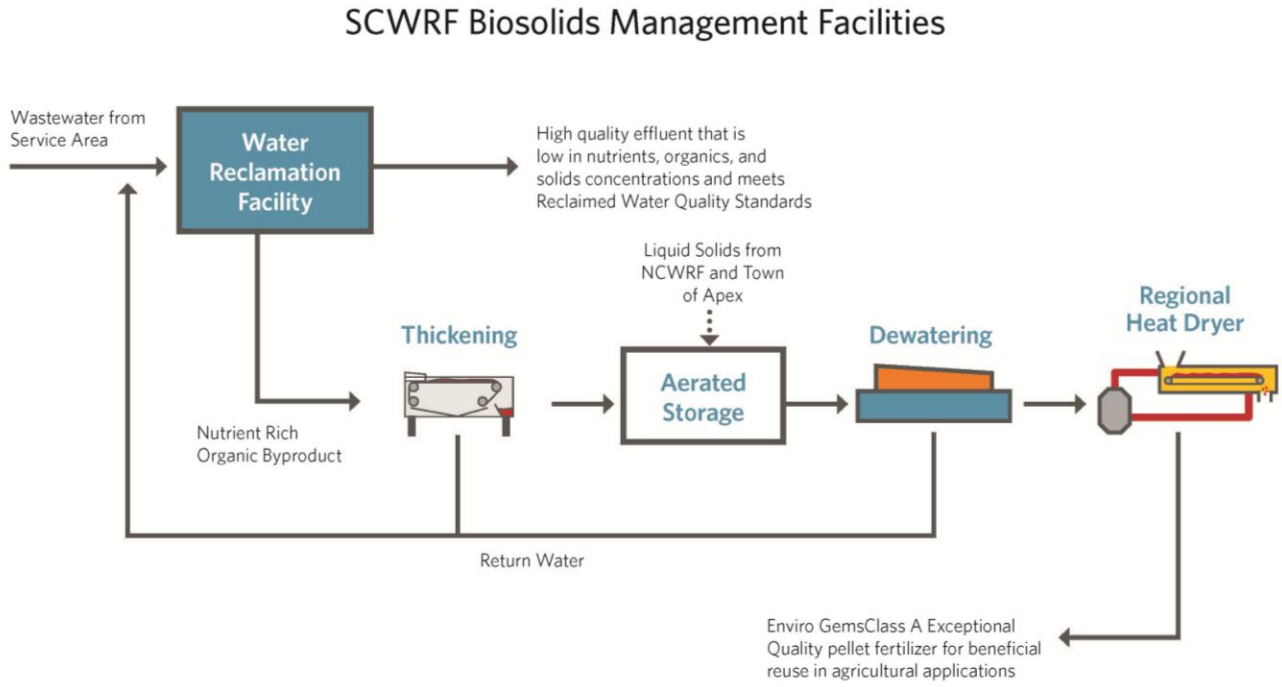
Town of Cary's Biosolids Management Program

Description of WRF Biosolids Handling Systems

North Cary Water Reclamation Facility (NCWRF)
At NCWRF, nutrient rich solids are a byproduct of the enhanced biological nutrient removal wastewater treatment process. These solids are removed from the biological treatment process and thickened on-site using one of two mechanical thickeners, called gravity belt thickeners. The purpose of the thickening process is to remove excess water to reduce the volume of solids that needs to be transported and treated. The thickened solids are stored temporarily onsite in one of two holding tanks. The tanks are aerated to maintain adequate oxygen level in the tank to keep the solids in an aerobic condition, which helps to minimize odors. The thickened solids are transported by truck from NCWRF to SCWRF for processing at the regional biosolids management facilities.



South Cary Water Reclamation Facility (SCWRF)



At SCWRF, nutrient rich solids are a byproduct of the enhanced biological nutrient removal wastewater treatment process. These waste solids are removed from the biological treatment process and thickened on-site using one of two mechanical thickeners, called gravity belt thickeners. The thickened solids are then stored in a holding tank. The tanks are aerated to maintain aerobic conditions in the tank. A single three-cell aerated sludge holding tank is currently used at SCWRF, which provides storage needed for all of the solids managed at SCWRF. The aerated holding tanks also receive thickened solids transported from the NCWRF and the Town of Apex.

The South Cary regional dryer treats liquid solids from NCWRF, SCWRF, and the Town of Apex for processing into a Class A Exceptional Quality pellet product.

The liquid solids are first dewatered using one of two dewatering devices, referred to as centrifuges. The centrifuges remove additional water from the solids, greatly reducing the volume of solids that needs to be dried.

One of two centrifuge dewatering units at SCWRF

The dewatered solids are then heat dried in the heat drying system. The South Cary regional dryer system includes a rotary drum dryer. Within the rotary drum dryer heat is applied directly to the dewatered solids to evaporate water from the solids and produce a final product that has a very low water content (greater than 90% solids content).

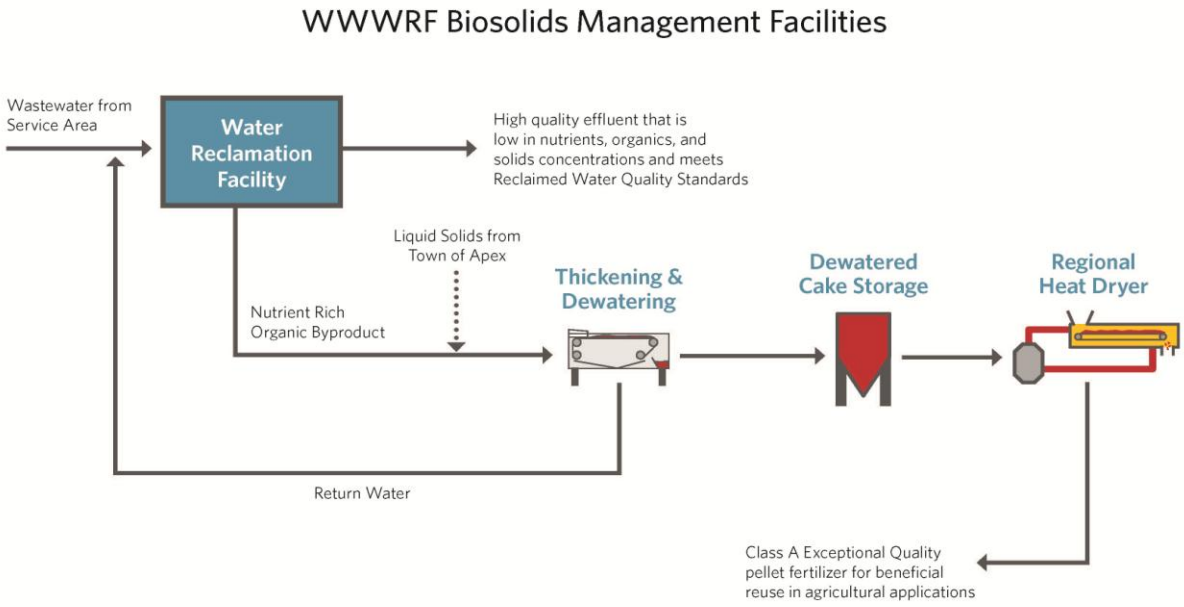
Heat Dryer System at SCWRF

The dryer removes most of the water from the solids and the final product consists of small, rounded pellets. The Town of Cary markets the final pellet product as Cary Enviro *Gems*. The name was selected from among more than 60 ideas submitted by Town employees during an internal naming contest.

Enviro *Gems* are temporarily stored in one of two storage silos located at SCWRF until they are transported offsite. The Town maintains a contract with a wholesaler, whom collects the pellets from the silos and distributes the pellets for beneficial reuse for agricultural usage. Town of Cary Enviro *Gems* have a fertilizer value of 5-4-0.

Storage silos used to temporarily store dried pellets on-site.

Western Wake Regional Water Reclamation Facility (WWRWRF)



In 2014, a second regional drying system began operating at the new WWRWRF. Like NCWRF and SCWRF, nutrient rich solids are a byproduct of the enhanced biological nutrient removal wastewater treatment process at WWRFWRF. These solids are removed from the biological treatment process and thickened and dewatered on-site using a combination thickening and dewatering device called a belt filter press. The dewatering facility also dewaters liquid solids from the Town of Apex Waste Water Treatment Facility. The belt filter presses remove excess water from the solids, greatly reducing the volume of solids that needs to be dried. The facility has three belt filter presses. The three presses allow the dewatering process to be operated continuously.

Combination thickening and dewatering belt filter press at WWRWRF

The dewatered cake is temporarily stored in a storage tank which feeds the dryer system. Dewatered solids are dried in a heat dryer system. Like SCWRF, the WWRWRF drying system uses

a direct heat dryer system, in which heat is applied directly to the dewatered solids to evaporate water from the solids and produce a final product that has a very low water content (greater than 90% solids content). WWRWRF utilizes a belt dryer system which is a different type of dryer system than the rotary drum dryer system used at SCWRF. The belt dryers operate at a lower temperature and dewatered cake is distributed onto a belt to increase the surface area exposed to the applied heat.

The belt drying system includes two belt dryer units. With two dryer trains, the dewatering system and dryer system can run continuously, with maintenance being conducted on off-line systems.

Installation of one of the belt dryers at WWRWRF

Definitions

Biosolids: Biosolids are the nutrient-rich organic byproduct of the wastewater treatment process which can be beneficially reused.

Class A Exceptional Quality Biosolids: Class A Exceptional Quality is the highest quality State and Federally regulated classification for biosolids. Class A biosolids are free of pathogens, can be distributed to the public, and can be beneficially reused without site restrictions.