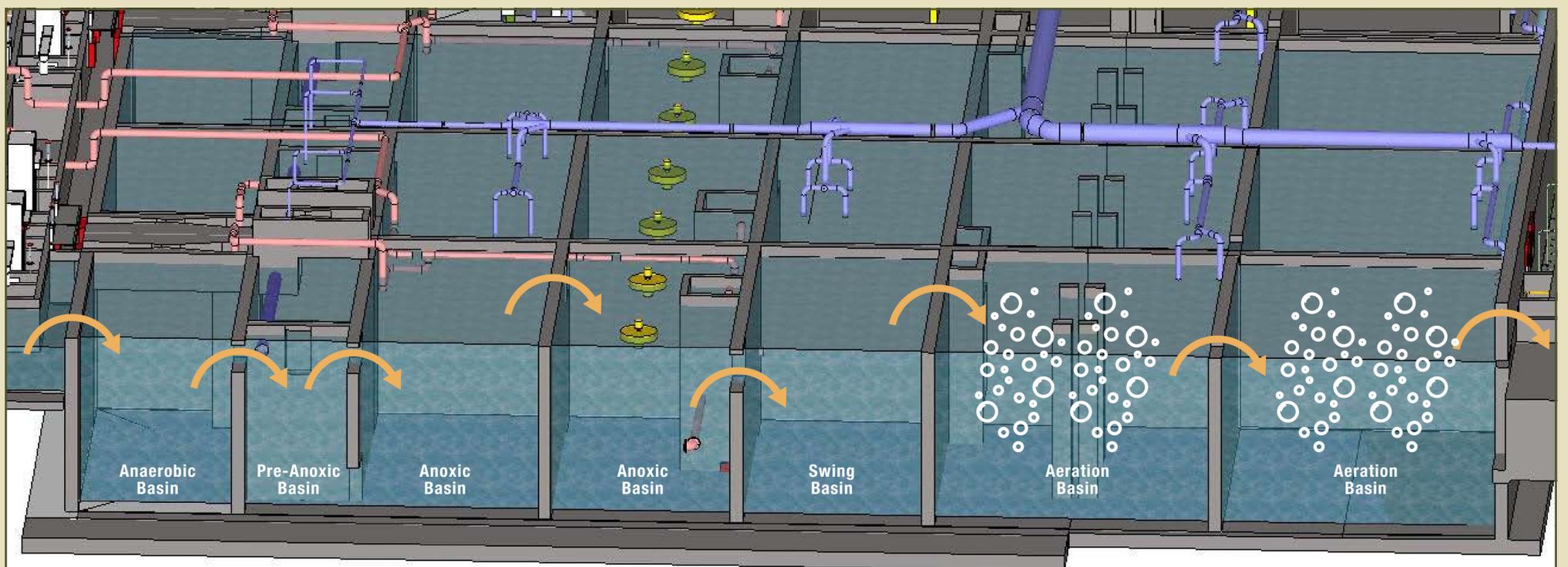


Biological Treatment – Nitrogen Removal

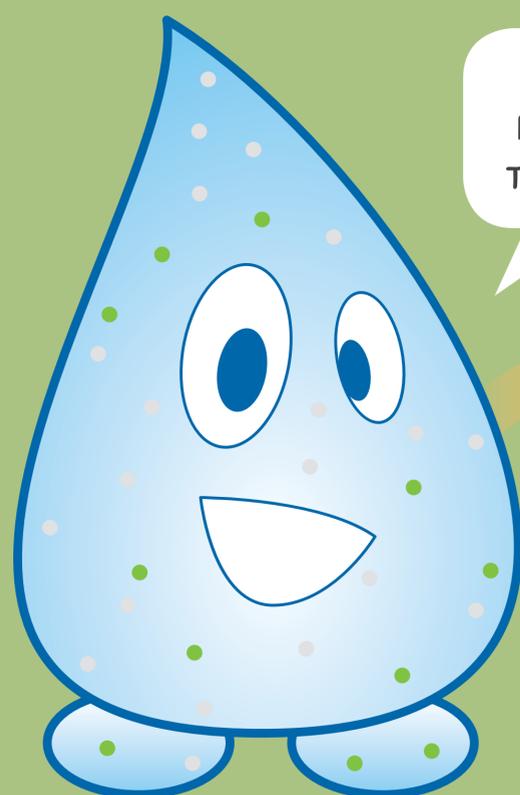
Johns Creek Environmental Campus



The biological treatment process at JCEC utilizes a concept of “activated sludge.” This process involves developing colonies of microorganisms within the basins that consume the nutrients in the incoming wastewater. Wastewater has high levels of ammonia that need to be removed; this is done biologically by microorganisms that are grown under different conditions. Aerobic conditions (high levels of oxygen) are created by bubbling air through the water and developing *Nitrosomonas* bacteria. These organisms facilitate a process known as nitrification, where incoming ammonia (NH_3) is converted to nitrite (NO_2^-) and to nitrate (NO_3^-). Anoxic conditions (lacking oxygen) are provided in some of the basins to allow denitrifying bacteria to develop. In these basins, nitrate (NO_3^-) is converted to nitrogen gas (N_2) and leaves the process through the odor control system. The return activated sludge (RAS) is a large flow rate that recycles flow within the plant from the membrane basins back to the anoxic basins. This return flow keeps the microorganisms active and effectively consuming nitrogen in the various forms.



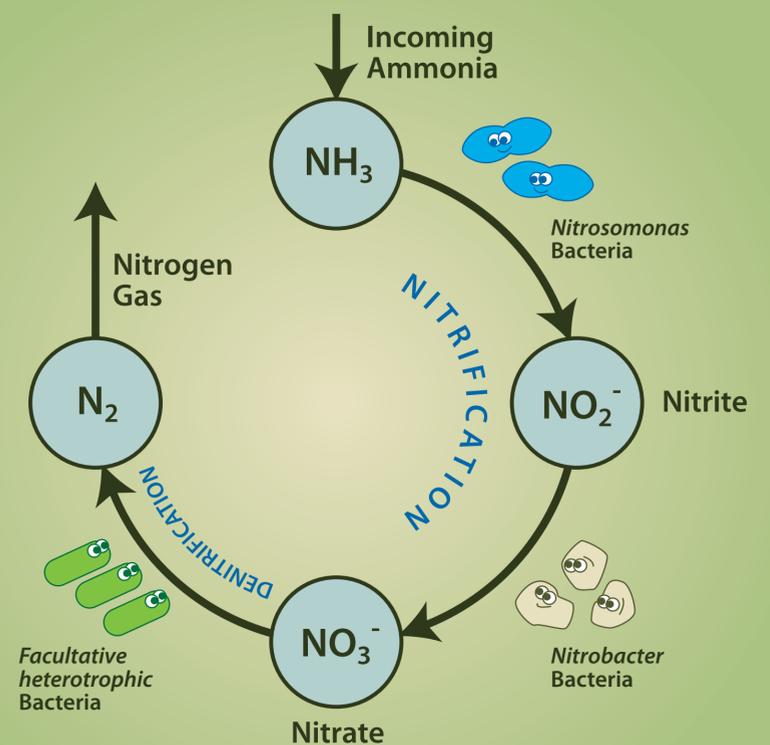
The biological basins remove nitrogen through the processes of nitrification and denitrification in the various basins.



NITROGEN IS A NUTRIENT THAT IS TRANSFORMED AND REMOVED THROUGH BIOLOGICAL TREATMENT.

N
Nitrogen

The Nitrification/Denitrification Cycle



Brown AND Caldwell