



making clean water affordable





Company president Grant Weaver is both a professional engineer and licensed wastewater treatment plant operator. Grant has been responsible for the operation and maintenance of municipal wastewater treatment facilities with flows ranging from a few thousand gallons per day to over 50 MGD.

Grant has operated, modified, and designed over two dozen wastewater treatment facilities to provide nitrogen removal and phosphorus removal.

The Water Planet Company's operations-based strategy is an outgrowth of Grant's experience and education. He holds a Bachelor of Science degree in Biology and a Master of Science degree in Bio-Environmental Engineering. This education has been supplemented with post-Graduate training in Environmental Toxicology at the Massachusetts Institute of Technology (MIT).

Grant understands the biochemical processes that remove pollutants from wastewater. His 30-plus years of hands-on experience and his commitment to making clean water affordable drives the company to provide municipal clients with new opportunities for reliable, cost effective wastewater treatment.

The Water Planet company works with innovative municipal professionals to save millions of dollars while realizing the immediate benefits of improved wastewater treatment.

- New waste treatment habitats are created in existing tankage.
- Effluent quality standards are met at one-half the cost of conventional design projects.
- Equipment is used differently to provide effective treatment while providing huge costs savings in avoided engineering and construction expenditures.
- Typical savings are in the millions of dollars.
- The use of new technologies allows for effective reuse of existing infrastructure.
- Eighty percent of wastewater treatment plants evaluated can meet increased effluent standards at savings of over fifty percent of traditional engineering designs.



Free, no obligation site visit:  
scheduled when convenient  
to municipal staff.





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## Our approach: operations-based wastewater design

Wastewater facilities are most appreciated when they invisibly provide consistent, reliable service. For more than a decade, the Water Planet Company has brought clean water to municipalities by using innovative design approaches to save client money. The Water Planet Company's success is rooted in a deep understanding of the biochemical processes that convert municipal wastewater to permit compliance effluent.

In approaching design challenges, Water Planet staff is always mindful of the objective: consistent, effective wastewater treatment.

To meet water quality objectives, we utilize technology.

First, we understand the status quo. We compile, analyze and supplement data. We learn from plant personnel by asking questions about how they operate and maintain their facilities: what they do and why tasks are performed the way they are.

As Water Planet and municipal personnel gain a shared understanding of current operating conditions, we explore alternative strategies. With staff input, we locate the bottlenecks to effective, efficient operations and explore strategies for addressing them. By combining our knowledge of biochemical processes, operational know-how, and client experience, we identify solutions that are simply unimaginable to most design firms.





Technology provides the tools to create more effective waste treatment habitats in existing tankage. Our understanding of instrumentation, computer controls, and biochemistry provides clients with effective, affordable wastewater treatment.



We feel that the most successful designs are those that cost the least to implement. Whenever practical, we perform full-scale, in-plant, trial runs before proceeding to permanent design. This approach allows us to scale our design solutions to exactly what the job requires. As a result, implementation costs a fraction of traditional designs.

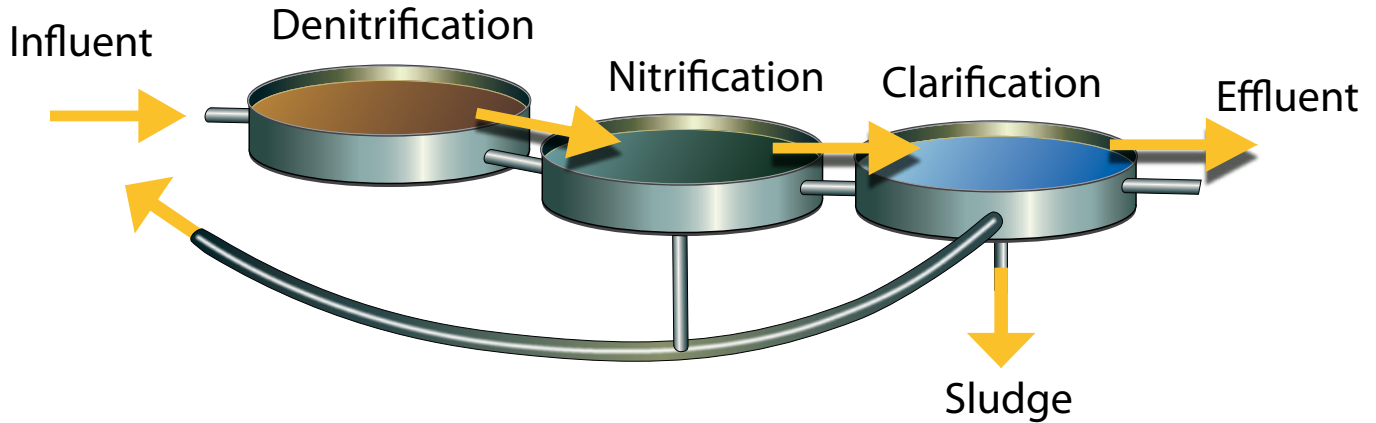
A fundamental component of the Water Planet Company's approach is the support we provide after modifications are made. We prepare written SOPs (Standard Operating Procedures), edit them to be consistent with our client's way of doing business, train, and provide ongoing staff support.

The Water Planet Company's operations-based design approach provides clients with proven solutions at a fraction of conventional design.

## Using Technology to Get Better Results from Existing Infrastructure

Machines convey sewage, people make clean water. A fundamental component of the Water Planet Company's approach is the support we provide after modifications are made. We prepare written SOPs (Standard Operating Procedures), edit them to be consistent with our client's way of doing business, train, and provide ongoing staff support.

# BIOCHEMICAL PROCESSES OF WASTEWATER TREATMENT



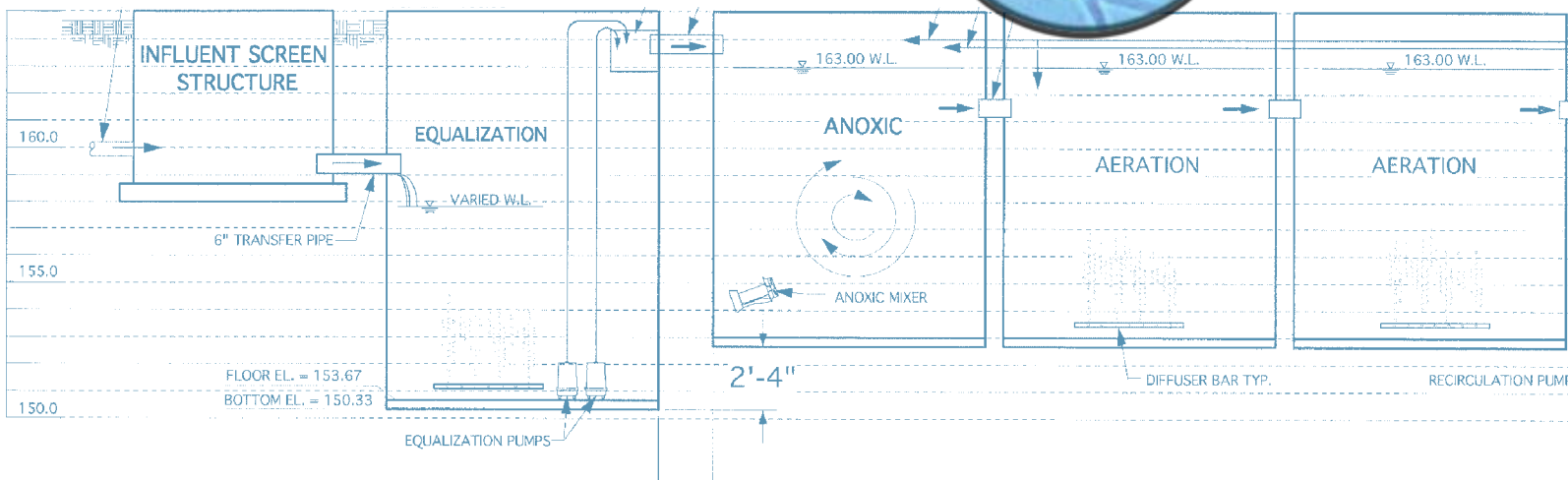
Microbial populations of bacteria, fungi, protozoa and rotifers residing in municipal wastewater treatment facilities utilize wastewater as a food source. Vast quantities of oxygen are consumed and an excess of single-celled organisms (sludge) is produced.

“Conventional” secondary wastewater treatment refers to the biochemical processes that remove oxygen depleting carbon, or cBOD, from the wastewater.

Additional, or “advanced,” wastewater treatment is the removal of nutrients – nitrogen and phosphorus – from the waste stream. Biological nutrient removal is maximized when wastewater treatment plants provide environments that support the biochemical processes that (a) convert ammonia to nitrogen gas (nitrogen removal) and (b) stimulate microbial uptake of orthophosphates (phosphorus removal).

The chemical pathways that provide biological nitrogen removal are well known. The environmental conditions which foster nitrogen and phosphorus removal are established, and manageable. Existing tankage can often be used to create habitats for improved biological nutrient removal with minimal capital outlay and at minimal operating expense.

**Biological Nitrogen Removal:** Nitrogen is biologically removed from wastewater in a two step process: *nitrification* followed by *denitrification*.



*Nitrification* (the conversion of ammonia to nitrates) occurs when there is abundant oxygen, long detention time, a low F:M, and older sludge - under-loaded aerobic conditions.

*Denitrification* (the conversion of nitrates to nitrogen gas) occurs when there is little to no oxygen, a high loading of biochemically active carbon source(s), and moderate to long detention time. That is, anoxic conditions with an abundant supply of short-chain carbon compounds.

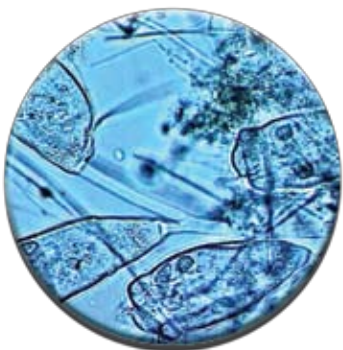
To balance *nitrification* and *denitrification*, a treatment plant must first nitrify ammonia in an aerobic environment before denitrifying the nitrates to nitrogen gas in a low-oxygen environment. Nitrogen gas is removed from the waste stream by escaping into the atmosphere; this is not of environmental concern. Nitrogen gas is an inert, non-pollutant; the atmosphere is 78% nitrogen gas and 21% oxygen.



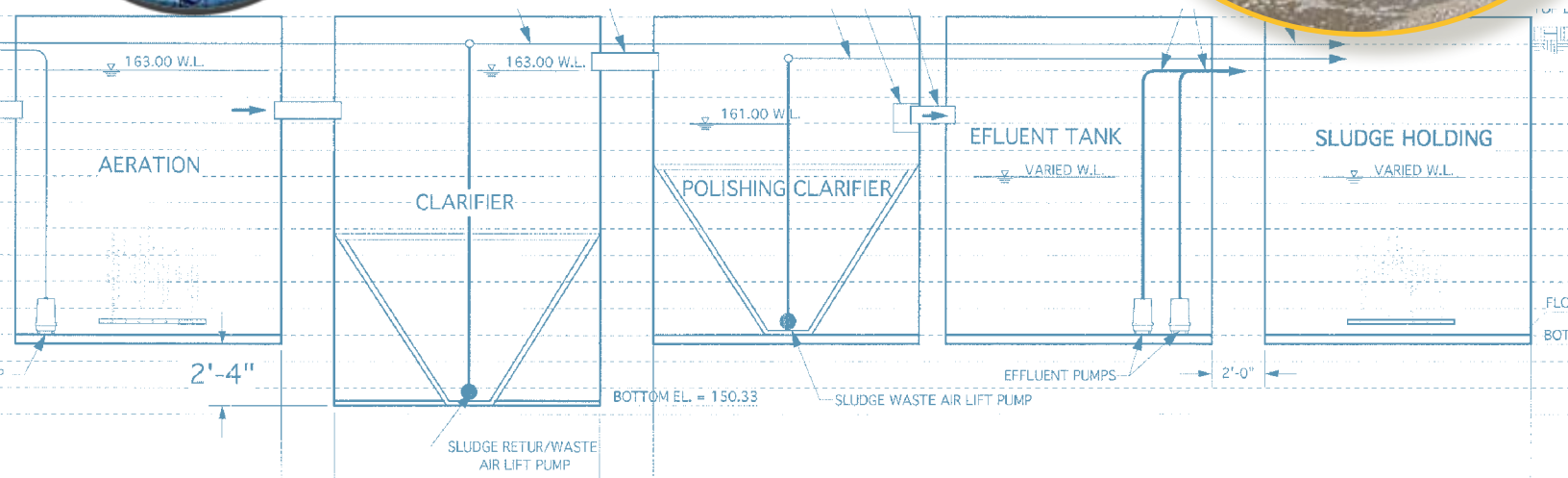
**Biological Phosphorus Removal:** Phosphorus is biologically removed when single cell bacteria accumulate soluble phosphates; phosphorus is removed with waste sludge.

Chemical processes occur during anaerobic conditions that allow mixed liquor to remove phosphorus from the waste stream under subsequent aerobic conditions.

**Maximizing Biological Nutrient Removal:** To maximize nutrient removal biologically, municipal wastewater treatment plants can modify oxygen levels, mixed liquor concentrations, return rates, recycle rates, sidestream flows, and add chemicals. Counter-intuitive practices often provide the best results: for example, reducing the amount of air used in aeration tanks or increasing the organic loading on unit operations can be highly effective solutions.



Microscopic views of stalked ciliates (single-celled bacteria) taken from a biologically viable municipal wastewater treatment facility.



# FREE NO-OBLIGATION SITE VISIT

We promise client satisfaction.



The Water Planet Company provides municipal clients with multi-million dollar savings by using existing infrastructure to house the biochemical processes that provide effective wastewater treatment.

Eighty percent of wastewater treatment plants evaluated can meet increased effluent standards at savings of over fifty percent of traditional engineering designs.

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