

Focus on: Domestic Wastewater Treatment Technology



Why it matters

Treating domestic wastewater or “sewage” is important for protecting public health and ensuring good water quality. There are various advanced treatment technologies that can remove nutrients, toxics, and other harmful pollutants to the Puget Sound and our Washington waters.

<https://ecology.wa.gov/Water-Shorelines/Water-quality/Wastewater>

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Special accommodations

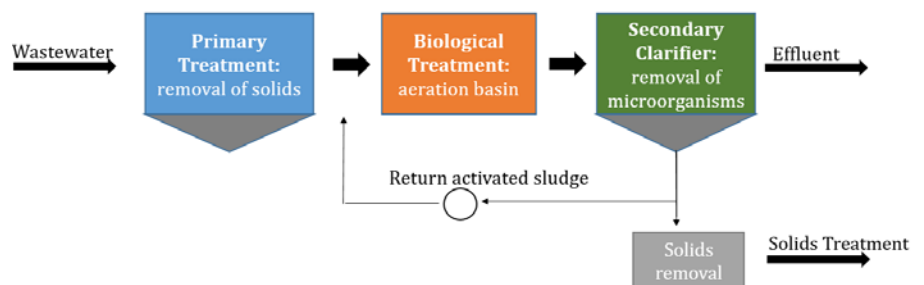
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Domestic wastewater treatment plants in Washington

There are over 300 domestic wastewater treatment plants (WWTP) in Washington, including 100 in the Puget Sound Basin, using many types of treatment processes. WWTPs are required, at a minimum, to treat wastewater to secondary treatment standards before discharging.

Conventional Secondary Wastewater Treatment

Conventional secondary wastewater treatment typically involves primary treatment to remove most solids, a biological treatment step that uses aeration, secondary clarification to both recycle (“return activated sludge”) and remove excess microorganisms for solids treatment, and disinfection. Wastewater is treated through the various steps and then discharged to the environment as a liquid called effluent.



Improving water quality through treatment advances

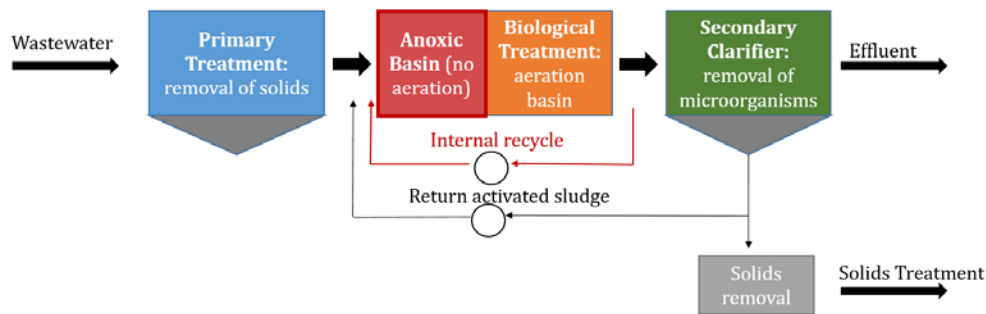
Advances in treatment technologies have allowed more removal of nutrients and other pollutants of concern that contribute to poor water quality. Advanced wastewater treatment refers to any treatment beyond conventional secondary treatment, such as enhanced nutrient removal, chemical addition, and filtration. Advanced technologies differ in cost and effectiveness. Ecology has funded advanced treatment projects, including nutrient removal, at publicly-owned WWTPs

Advanced wastewater treatment technologies

The following diagrams provide simplified examples of advanced wastewater treatment processes:

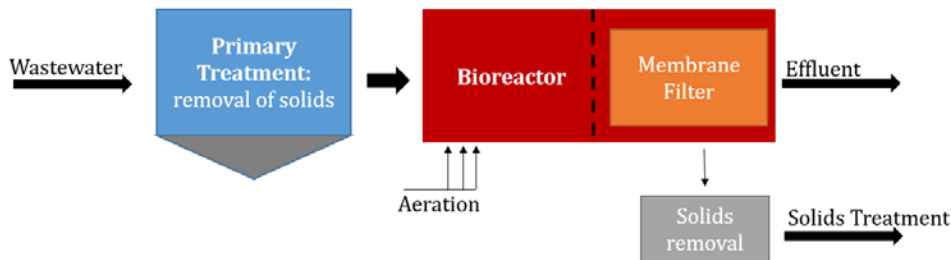
Advanced Wastewater Treatment for Biological Nutrient Removal

Conventional secondary wastewater treatment does not remove nutrients, but it is possible to modify the process for biological nutrient removal. The example below removes nitrogen biologically. This requires internal recycling and the use of a low-oxygen basin followed by an aerated basin. Biological phosphorous removal is also possible with additional basins in a different configuration.



Membrane Bioreactor

Membrane bioreactor (MBR) treatment combines conventional secondary treatment with membrane filtration. This treatment replaces the secondary clarifier with membrane filters. MBRs by themselves are not considered tertiary treatment. MBRs can be configured for removal of nutrients and other pollutants. Any treatment process after the MBR is considered tertiary. With additional disinfection, MBRs can produce Class A reclaimed water.



Tertiary Treatment

Tertiary treatment involves a third treatment process, often chemical addition and filtration, after secondary treatment. The third step varies by specific nutrient or pollutant. The diagram below shows chemical phosphorus removal. Tertiary filtration can also provide filtration for Class A reclaimed water.

