Your Guide to the

Budd Inlet Treatment Plant

LOTT™ Clean Water Alliance

What does the Budd Inlet Treatment Plant do?

The treatment plant cleans wastewater, which is all the water that runs down the drain in our homes and businesses. Water from sinks, dishwashing, laundry, showers, toilets, industrial processes and countless other uses becomes wastewater. Millions of gallons of wastewater are produced every day in our communities. After wastewater goes down the drain, it travels through underground sewer pipes to the treatment plant. LOTT treats an average of 12 million gallons of wastewater every day.

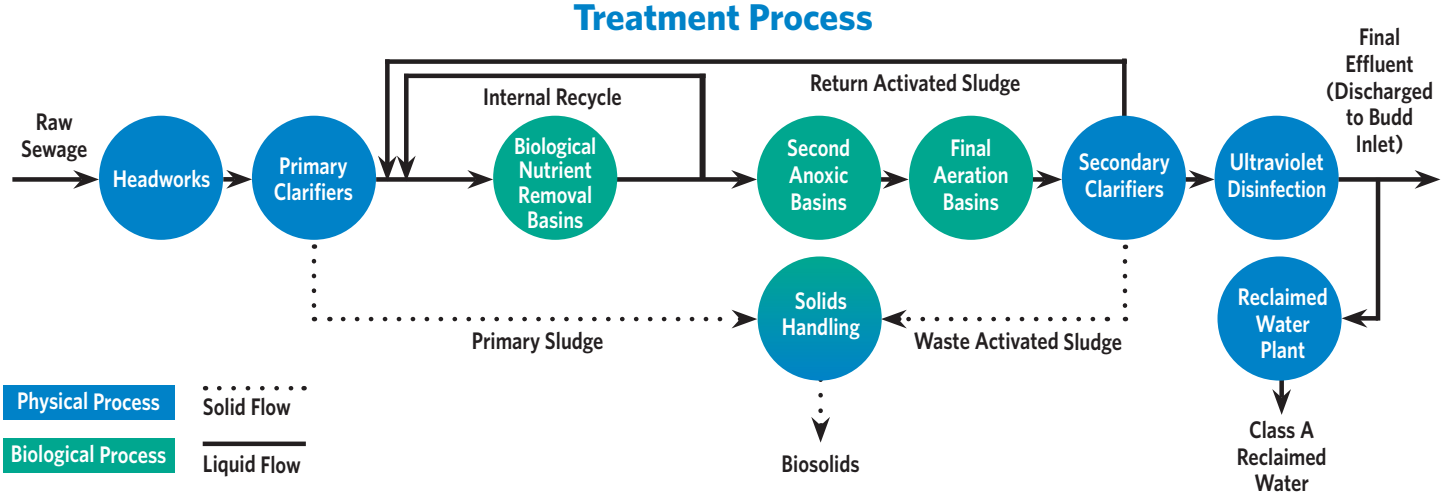
Wastewater contains many pollutants that must be removed before clean water can be safely returned to the environment. The Budd Inlet Treatment Plant cleans water to a very high standard, which includes additional nutrient removal. This treatment process mimics nature's system of cleaning and recycling water, but it happens much quicker – in about one day. If there is too much nitrogen in the treated water, it could contribute to algae blooms and oxygen depletion, which harms the marine ecosystem. Our treatment process is highly effective at reducing nitrogen levels in the water that is released to Budd Inlet, helping to protect water quality.

The Budd Inlet Treatment Plant produces a number of useful products. Methane produced in the digesters during solids handling is used to generate heat and electricity, which are put to use onsite. Biosolids are hauled to farmlands for use as a soil amendment and fertilizer. Highly treated Class A Reclaimed Water is used in plant processes and throughout our local communities for irrigation and other non-drinking uses.

How does the treatment process work?

LOTT's Budd Inlet Treatment Plant offers the highest level of wastewater treatment on Puget Sound. Treatment involves both physical and biological processes. For example, settling is a physical process; by slowing the flow of the wastewater, lighter particles float to the top and heavier particles sink to the bottom, leaving the water in between cleaner. In contrast, biological treatment processes rely on bacteria to clean the wastewater. Their environment is controlled so that they break down or consume pollutants in the water that are not removed by the physical processes. As wastewater moves through the steps in the treatment process, some of the bacteria and flow are recycled to sustain the physical and biological processes involved in treatment.

Treatment Process



Steps in the Treatment Process

1 Headworks

Wastewater enters the treatment plant and flows through escalator screens, which remove trash, and grit channels, where sand, gravel and grit are removed. This area has storage tanks to manage flow from heavy rains.

2 Primary Clarifiers

The flow of the wastewater is slowed so that lighter solids float to the top and heavier solids sink to the bottom. Cleaner water in the middle continues through the treatment process. The solids are removed and sent to Solids Handling (Step 8).

3 Biological Nutrient Removal (BNR) Basins

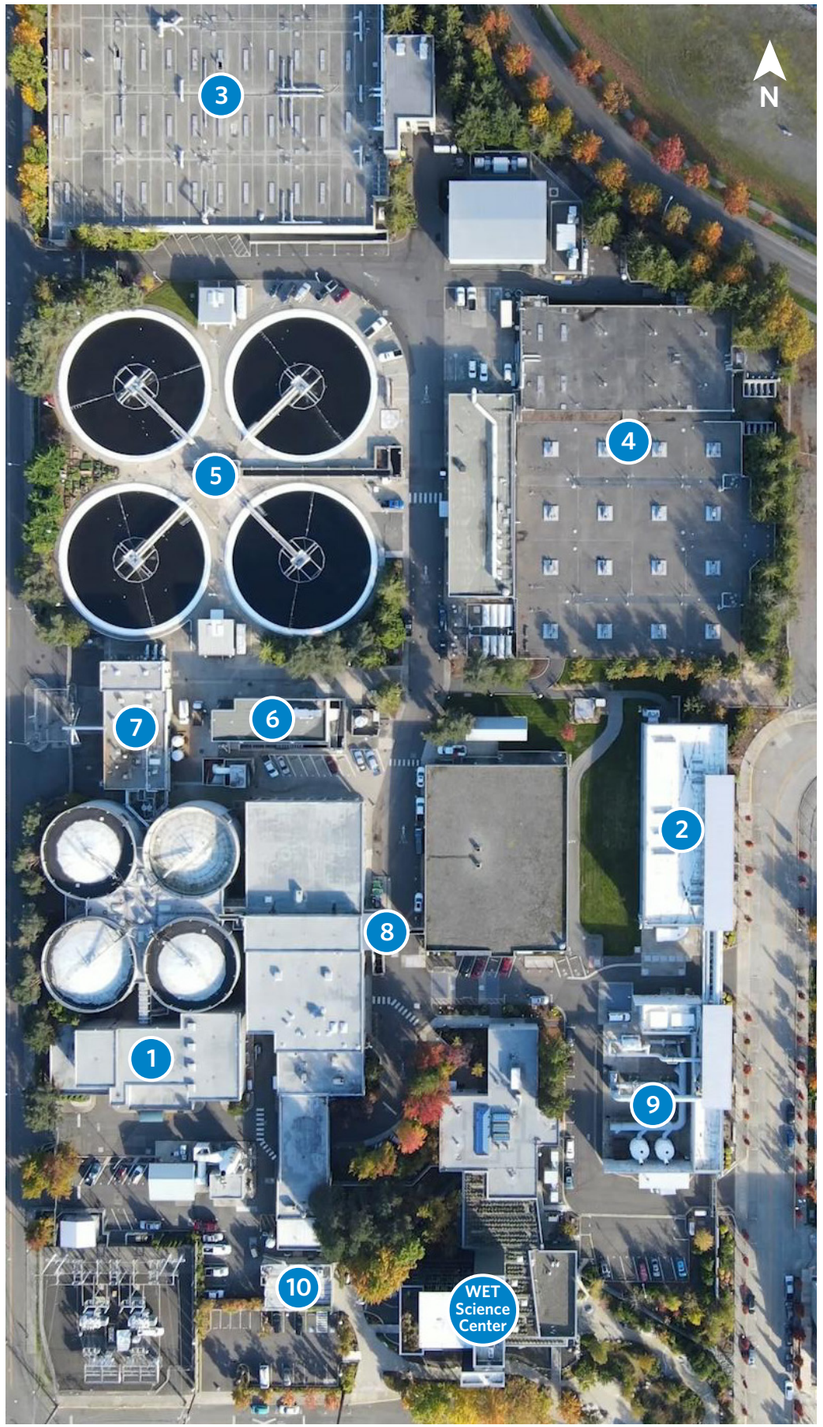
Flow from the Primary Clarifiers is mixed with helpful bacteria from other parts of the treatment process. The bacteria go to work breaking down waste and removing extra nutrients (nitrogen) from the water. Some bacteria (nitrifiers) do their work with oxygen present, converting ammonia to nitrate. Other bacteria (denitrifiers) work without oxygen. Internal Recycle returns up to 80% of the flow from the end of the BNR train back to the beginning for further treatment. The remaining 20% continues on to Step 4.

4 Second Anoxic and Final Aeration Basins

In Second Anoxic, oxygen-deprived bacteria convert nitrates to harmless nitrogen gas. In Final Aeration, air is pumped into the flow to help bacteria remove pollutants and ensure dissolved oxygen is present in the flow at the end of the treatment process.

5 Secondary Clarifiers

The flow is slowed dramatically so that solids and bacteria can settle. Most of the settled bacteria are pumped back to the BNR basins (Step 3). The remaining solids are sent to Solids Handling (Step 8). The treated flow continues on to Ultraviolet Disinfection.



6 UV Disinfection

The flow is exposed to ultraviolet (UV) light to prevent bacteria from reproducing. Disinfected flow is called "final effluent." The treatment process has now removed over 95% of the pollutants.

7 Final Effluent Pumping

Most of the final effluent is pumped to the north end of the port peninsula where it is discharged to Budd Inlet. Some of the final effluent is diverted to the Reclaimed Water Plant (Step 10) for further treatment.

8 Solids Handling

Solids are thickened and pumped to the digesters. Over half of the organic material is converted to methane gas by anaerobic bacteria. The methane gas is converted to provide heat and power used for plant processes and buildings. The remaining sludge is dewatered in a centrifuge. The resulting "biosolids" are hauled offsite to farmlands and used as a soil amendment and fertilizer.

9 Odor Scrubbers

Odors generated during the treatment process are funneled through Odor Scrubbers that use carbon or a chlorine solution to remove odors. The cleaned air is released to the environment.

10 Reclaimed Water Plant

Each day, up to one million gallons of final effluent is diverted here, cleaned through sand filters and chlorinated to meet strict Class A Reclaimed Water standards. Class A Reclaimed Water is used onsite for treatment processes and distributed through a purple pipe network for community use as irrigation and for other non-drinking purposes.

How does LOTT know the plant is working correctly?

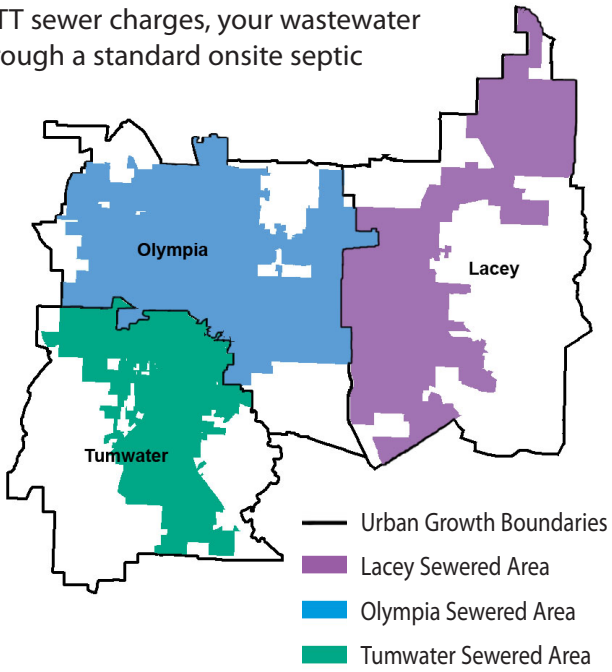
All activity within the treatment plant is monitored 24 hours a day, 7 days a week. A highly trained team of operations, maintenance, laboratory, control systems and administrative staff keeps the utility running efficiently. State-certified operators are responsible for running and monitoring the treatment processes. This is done via computer control systems and on-the-ground observations of equipment and processes many times each day.

The treatment plant houses a state-certified laboratory. Daily tests are run on samples from each step in the treatment process, including the final stages as cleaned water is released to Budd Inlet, or diverted for further treatment and use as Class A Reclaimed Water. Biosolids are also tested during treatment and prior to leaving the plant. LOTT monitors its processes and finished products carefully to ensure compliance with the strict standards required by its National Pollutant Discharge Elimination System (NPDES) permit issued and enforced by the Washington State Department of Ecology, and the state reclaimed water permit. Highly skilled staff members check, maintain and repair LOTT's state-of-the-art equipment and facilities.

Is my wastewater treated at the Budd Inlet Treatment Plant?

For most people who live, work or go to school in Lacey, Olympia or Tumwater, or the associated urban growth areas, the answer is yes! Check your utility bill for city and LOTT sewer charges. Those fees mean your wastewater is treated through the LOTT wastewater system. Your property most likely has a full sewer connection, meaning all your wastewater travels through pipes from your home or business into the sewer collection system and on to the treatment plant. Properties that do not have a full sewer connection are served by STEP systems that are managed by one of the three cities. STEP systems are a combination of onsite septic systems and sewer service. They have an underground septic tank on the property to temporarily store solid waste, and the liquid waste travels through pipes into the sewer system. The city pumps the solids out of the STEP tanks every few years and hauls them to LOTT for treatment at the Budd Inlet Treatment Plant.

If you do not pay LOTT sewer charges, your wastewater is likely managed through a standard onsite septic system. These septic systems have two underground parts on the property – a septic tank to store solid waste and a drainfield to disperse the liquid waste. Liquid waste travels through the drainfield and down into the soil in your yard to be filtered before returning to the groundwater. Solids in the septic tank must be emptied out every few years to ensure the system continues to work properly. Septic haulers pump the tanks and take the solids to a receiving station for treatment elsewhere.



What is LOTT?

The LOTT Clean Water Alliance is a non-profit corporation formed by the cities of Lacey, Olympia and Tumwater, and Thurston County. LOTT's mission is to preserve and protect public health and the environment by cleaning and restoring water resources for our communities. As the local population within the LOTT service area grows, so too must LOTT's ability to manage wastewater through treatment and production of reclaimed water.

LOTT is governed by a Board of Directors made up of four elected officials – one from each of the partner governments. The Board oversees planning, construction, financing and operations of LOTT programs and facilities.

For more information about the LOTT Clean Water Alliance, visit our website at www.lottcleanwater.org.

Visit the WET Science Center!

LOTT's WET Science Center is a fun, hands-on place to learn all about water – one of our most precious resources. The center features interactive exhibits, weekend family activities, environmental presentations, education programs for school and community groups, and tours of the wastewater treatment plant and LEED Platinum-certified building.

The WET Science Center has a variety of games and activities for all ages – most are designed for children ages 10 and up, as well as adults. Exhibits and interactive video games include information about:

- The natural and built water cycle, water use and water conservation.
- Wastewater treatment, including the role of bacteria in the nitrogen removal process.
- What not to flush or put down the drain.
- Production and use of Class A Reclaimed Water.
- Career opportunities at the LOTT Clean Water Alliance.
- Stewardship of Puget Sound.

To inquire about a tour or education program, please call (360) 664-2333.

It's always free to visit!
500 Adams Street NE in downtown Olympia

www.wetsciencecenter.org

LOTT™ Clean Water Alliance

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