# Terrence J. O'Brien Water Reclamation Plant



*O'Brien Water Reclamation Plant*

The Terrence J. O'Brien Water Reclamation Plant (WRP) is one of seven wastewater treatment facilities owned and operated by the Metropolitan Water Reclamation District of Greater Chicago (MWRD). The MWRD is the wastewater treatment and stormwater management agency for the City of Chicago and 128 Cook County communities. We work every day to mitigate flooding and convert wastewater into valuable resources like clean water, phosphorus, biosolids and natural gas.

If you live within our service area, the water that goes down your toilet, sinks and drains eventually comes to us to be cleaned. We treat wastewater from homes and businesses throughout our 883-square-mile service area in addition to stormwater from some communities. All of this wastewater and stormwater flows through local sewers into our interceptors before flowing to WRPs where we clean the water and recover resources using a combination of physical, biological, and sometimes chemical, treatment processes.

The MWRD provides this service for over 5 million people. Nearly 450 billion gallons of wastewater is treated by our seven facilities every year.

The O'Brien WRP (originally called North Side) was built to serve residents in communities north of downtown Chicago. In operation since 1928, the O'Brien WRP originally treated sewage for a population of 800,000 within a 78-square-mile area, but now both the service area and the population are nearly twice as large. The O'Brien WRP currently serves over 1.3 million people in an area of 143 square miles and cleans an average of 230 million gallons of wastewater per day (mgd) and has the capacity to treat 450 mgd.

## Wastewater Treatment

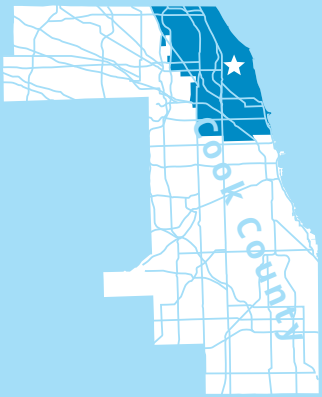
Wastewater treatment works using processes similar to those that occur naturally in rivers to clean water, incorporating physical and biological processes with a combination of air, gravity and microorganisms. In a WRP, cleaning is sped up dramatically, so a process that could take weeks in a river happens over the course of hours.

The goal of wastewater treatment is to reduce contaminants in water, such as suspended solids, biodegradable organic matter, pathogenic bacteria and nutrients. Contaminants are removed during three major phases of treatment: primary, secondary and tertiary. All MWRD WRPs use primary and secondary treatment. Some of our facilities also apply tertiary treatment due to the nature of the waterways into which they release water.

**Primary treatment:** Wastewater arrives at the plant and passes through coarse screens to filter out large debris. Then it is pumped up from sewer level and flows by gravity throughout the treatment plant. In primary treatment, aerated grit tanks and settling tanks use physical and mechanical means to remove fats and oils and to separate solids from the water. The separated solids are pumped away to undergo their own treatment process and eventually become biosoilds, a sustainable alternative to chemical fertilizers. By the end of primary treatment, 60-80% of the solids have been removed.

**Secondary treatment:** In secondary treatment, a community of microorganisms

### O'Brien WRP Service Area




**The O'Brien WRP serves 1.314 million people within 143 square miles in the northeast area of Cook County, Illinois.**

### O'Brien WRP Communities

| | |
|---|---|
| Chicago | Morton Grove |
| Des Plaines | Niles |
| Evanston | Norridge |
| Glencoe | Northbrook |
| Glenview | Northfield |
| Golf | Park Ridge |
| Harwood Heights | Skokie |
| Kenilworth | Wilmette |
| Lincolnwood | Winnetka |

### About O'Brien WRP

- 3500 Howard Street, Skokie, IL 60076
- 187 employees
- 14 buildings on 97 acres
- In operation since October 3, 1928

### Receiving Stream

- North Shore Channel

### Treatment Volume

- 230 million gallons/day (avg.)
- 450 million gallons/day (max.)

help remove organic material from the wastewater. The microbes need oxygen to thrive, so air is pumped through the water in secondary aeration tanks. Next, the water enters the final settling tanks where remaining solids settle to the bottom and clean water flows out the top.

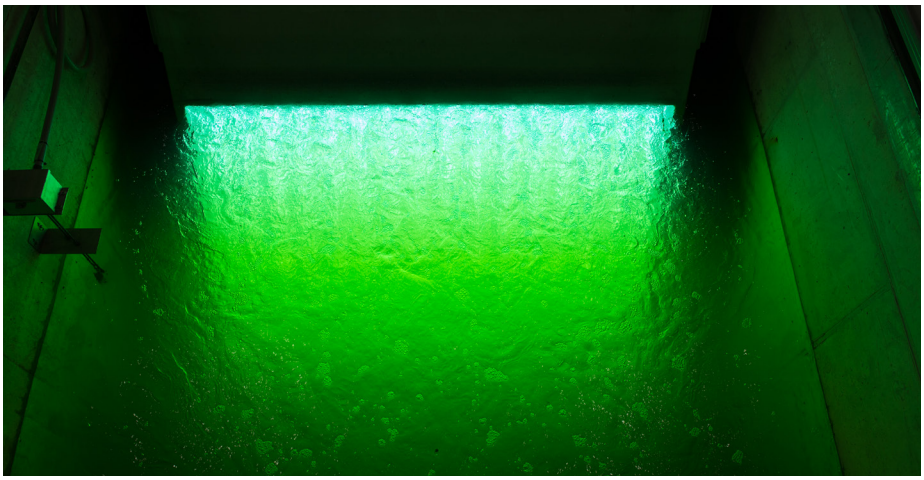
**Tertiary treatment:** Tertiary treatment includes any additional processes used to further clean the water, including disinfection and filtration. The O'Brien WRP features the largest ultraviolet (UV) disinfection facility for a wastewater plant in the U.S., with a capacity to treat over 450 million gallons per day. UV disinfection uses powerful utraviolet light to neutralize any microbes in the water. After passing through the UV facility, clean water is released from the O'Brien WRP into the North Shore Channel.

**So the water is clean; what happens to all the solids?** The solids removed from the wastewater during primary and secondary treatment are sent to temperature-controlled digesters where microorganisms break them down in a process similar to composting. As with compost, the digestion process converts nutrients to forms that plants can use, kills pathogens, and reduces odors. After digesting, the solids pass through centrifuges which work like a washing machine, spinning at high speeds to remove water. The resulting drier solids are aged and air-dried to refine moisture content and further reduce odors.

The solids from O'Brien WRP are pumped to the MWRD's Stickney WRP for digestion and then to solids management areas for additional treatment and drying. The resulting biosolids are used as a soil amendment at golf courses, athletic fields, parks and recreational facilities, agricultural fields, forests, and for restoration of strip mines and other disturbed lands.

**Resource recovery:** In addition to primary, secondary and tertiary treatment processes, we're also adding innovative technologies and methods of recovering nutrients, such as phosphorus, from wastewater. Nutrient pollution is harmful to waterways and aquatic life and poses a threat to healthy drinking water supplies. Phosphorus is a non-renewable resource that is in dwindling supply and is essential for high-yield agriculture and myriad industrial uses. The MWRD has the means to recover up to 10,000 tons per year of phosphorus and convert it into a usable, marketable product.

**How do we know we're doing a good job?** Wastewater treatment facilities are regulated under the Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) permit program. NPDES permits set rigorous standards that the water from the plant must meet. The National Association of Clean Water Agencies has given the O'Brien WRP the association's highest awards for compliance with these standards. We also see the benefits of our work resulting in increased recreation on the waterways, such as kayaking and canoeing, a rebounding aquatic habitat and increases in fish species. We're reducing energy use at our facilities with a goal of reducing greenhouse gas emissions, and we're recovering valuable resources and expanding the use of biosolids throughout the region.



*Powerful UV light neutralizes microbes in the water before it is released from the O'Brien WRP. Although UV the light itself is invisible, the 896 bulbs in the disinfection facility emit green light in the visible spectrum.*



*Microbes such as these stalked ciliates help remove bacteria and organic material from the water in secondary treatment.*



**If you flush a toilet in Lincolnwood, it takes less than 30 minutes for the water to reach O'Brien WRP** (in dry weather) and just 12 hours to go through the treatment process before it is released as clean water to the North Shore Channel.

**Coarse screens catch large objects and debris in water as it enters a wastewater treatment plant.**
Some of the things that have turned up in the coarse screens of our plants over the years include:

- ✓ A 14" diameter snapping turtle
- ✓ Car wheels and tires
- ✓ 2x4 studs
- ✓ Super balls
- ✓ Parking blocks
- ✓ Money
- ✓ A huge ball of rope
- ✓ A 50 foot extension cord
- ✓ Mop heads
- ✓ Tree branches
- ✓ Two opossums
- ✓ ID card of a man from Argentina
- ✓ A bowling ball (with no pins)
- ✓ Fish
- ✓ A prosthetic leg

