A Service of The City of Cincinnati

GREATER CINCINNATI
WATER WORKS

GREATER CINCINNATI WATER WORKS

WATER TREATMENT

GCWW VISION, MISSION & VALUES

The "Water Works Way"

The "Water Works Way" is the guiding principle for our professional lives that starts with values from our personal lives. Established by, and for, the employees of GCWW, we stand behind them every day, along with the following Vision, Mission and Values:

VISION

To be the standard of excellence in water services.

MISSION

GCWW employees provide customers with a plentiful supply of high quality water, support environmental sustainability, and deliver excellent services in a financially responsible manner.

VALUES

Collaboration, Innovation, Integrity, Learning, Passion, Respect, Service, and Stewardship

Value Statements

CUSTOMERS AND COMMUNITIES

We will earn support and loyalty through our passion for quality and service, dedication to health and welfare, respect for customer and community needs, and commitment to operating an efficient, financially responsible, and innovative utility organization.

EMPLOYEES

We have a deep respect for our fellow employees and will cultivate a learning environment through knowledge building and collaboration; build an atmosphere of trust, commitment, opportunity, and integrity; and treat employees as our most valuable resource in serving our customers and communities.

ENVIRONMENT

We will protect public health and the environment through a commitment to future generations, a focus on environmental stewardship, the application of innovative processes and technologies, and an understanding of regional issues.

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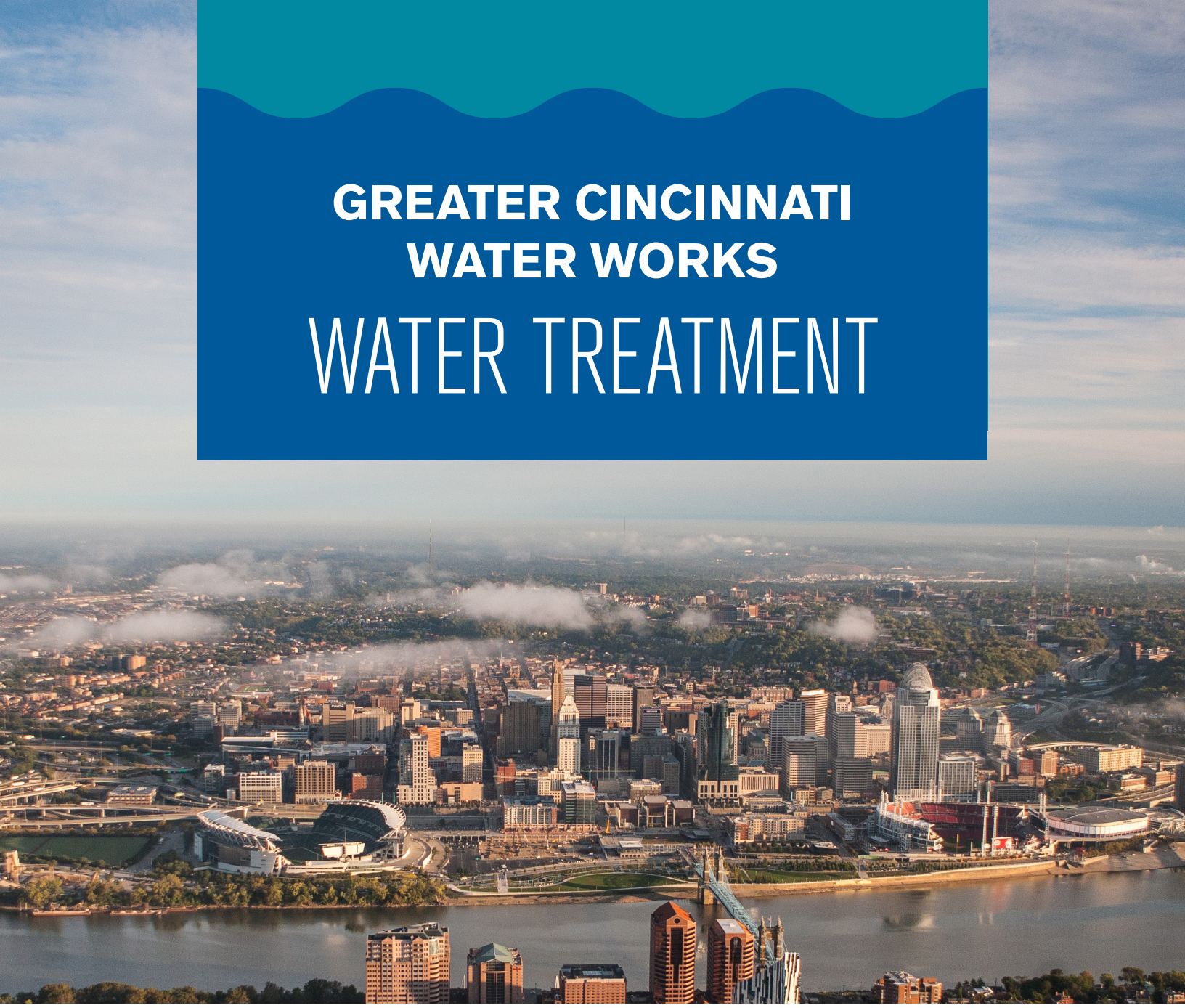
GREATER CINCINNATI WATER WORKS

WATER TREATMENT



Providing a Plentiful Supply of the Highest-Quality Water

Greater Cincinnati Water Works (GCWW) is a department of the City of Cincinnati and provides water to more than 1.1 million customers. This water is used for drinking, common household uses, irrigation, industry, healthcare, fire-fighting and many other applications within our region. Ensuring safe, high-quality water requires a complex, large-scale process that operates around the clock.

GCWW has two water treatment plants: Richard Miller Treatment Plant (RMTP) and Charles M. Bolton Plant (CMBP). RMTP is located east of downtown Cincinnati. It is a surface water treatment plant and draws water from the Ohio River. CMBP is a ground water treatment plant and draws water from the Great Miami Buried Valley Aquifer. Certified plant operators, professionals and skilled tradespeople handle the daily operation and maintenance of both treatment plants.

What is the Difference Between Surface Water and Ground Water?

SURFACE WATER

Surface water refers to open bodies of water – this includes rivers, lakes, streams, ponds, and reservoirs. This type of water is subject to larger, faster changes in water quality which can be caused by rain events, floods, droughts, algae blooms (a rapid increase in the population of algae in an aquatic system), and chemical spills. Surface water is collected through an intake which pumps a small percentage of this water for treatment.

GROUND WATER

Ground water refers to water contained or transmitted within aquifers, bedrock fractures and other natural underground spaces. In our region, aquifers are natural, underground deposits of gravel and sand. Water percolates through the ground and collects within the tiny spaces in these deposits. Although it moves much slower than surface water, ground water usually does have a measurable level of flow often measured in feet per day. This type of water is naturally pre-filtered and usually requires less intensive treatment to reach high standards of quality. Ground water is collected through wells drilled into the water source.

FACTS & FIGURES

RICHARD MILLER TREATMENT PLANT (RMTP)

240 MILLION

gallons per day (MGD) maximum capacity

BUILT IN 1907,

with major renovations and/or additions in 1938, 1967, 1992, 2001, and 2013.

CHARLES M. BOLTON PLANT (CMBP)

40 MILLION

gallons per day (MGD) maximum capacity

BUILT IN 1976

Richard Miller Treatment Plant

HISTORY

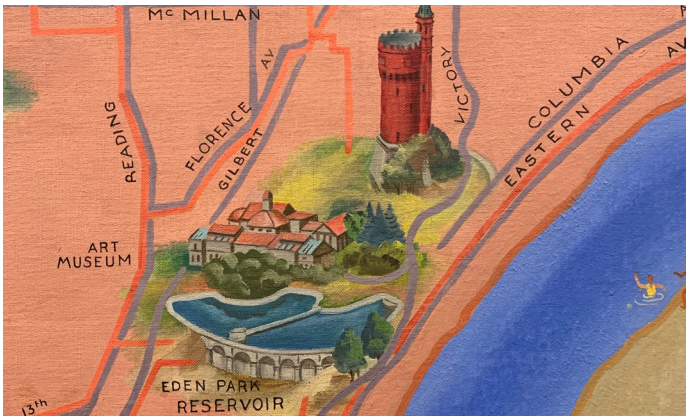
Richard Miller Treatment Plant (RMTP) was constructed during the period of 1897 to 1909 during the "New Works" era of Greater Cincinnati Water Works. During this period, the city built an entirely new "Water Works" including the treatment plant and pumping stations.

RMTP was constructed upriver from the prior location on Front Street (now near Riverside Drive and Pete Rose Way) to improve water quality and meet the needs of a growing community. It was placed above the Little Miami River's confluence with the Ohio River to reduce risk to the water supply by another tributary. At this new plant, George Warren Fuller pioneered implementation of Rapid Sand Filtration, also known as the "American Filtration System," now commonly used by water utilities throughout the world.

In 1938, "Cincinnati Water Works", in conjunction with the Public Works Administration (part of Franklin D. Roosevelt's "New Deal"), rebuilt and expanded the treatment plant to provide for better pre-treatment, enhance chemical-handling equipment and facilities, and increase capacity. The filter building was expanded to 40 sand filters with room for more to be added later. A new, modern chemical building was constructed during this expansion as well. With this project, Cincinnati became the first water plant to be fully electrically operated.*

The 1938 renovation included a grand entrance and what is now used as an onsite museum of GCWW history. The style is Art Deco/Moderne, similar to other famous Cincinnati buildings built around the same time (Union Terminal, Netherland Plaza Hotel and others). Public projects around that time tended to include work by local artisans. As such, there is a large, hand-painted map of the GCWW service area and tiling in a popular style of that time, similar to that of the Rookwood Pottery company. These features now greet visitors and tour groups as they learn about GCWW's rich history of successful water treatment.

In 1967, the filter building expanded to 47 sand filters.



Hand-Painted GCWW Service Area Map from 1938

**"Cincinnati's New Water Works" – American City April 1938*

DID YOU KNOW?

Green Energy Fact

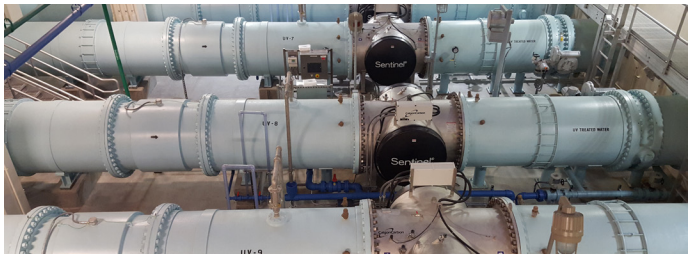
WATER WHEELS AND HYDRAULIC JUMPS

Smart design of the 1938 renovations included two water wheels and “hydraulic jumps,” both which reduced the need for additional power. The water wheels reclaim potential energy in the water as it passes from the high level of the settling reservoirs to the lower level of the treatment plant. The “hydraulic jumps” take advantage of this same potential turned into kinetic energy by mixing chemicals at this step with no added power. The “hydraulic jump” design was even patented by a former GCWW employee, Joseph W. Ellms!

In 1992, the state-of-the-art Frank Harris, Sr. Granular Activated Carbon (GAC) facility was brought online. This facility reasserted Cincinnati at the forefront of water treatment technology and was the result of much research and planning including a multi-year pilot program in cooperation with the United States Environmental Protection Agency (USEPA). The insights and knowledge gained have benefited water utilities nationwide and GAC continues to be reaffirmed as a “best available treatment technology.”

RMTP Carbon Building

As part of a multi-barrier approach to ensure safe drinking water, the Ultraviolet (UV) Disinfection Treatment facility was opened in 2013. GCWW worked with national and international scientists and water technology experts to determine the best treatment technology to enhance the water treatment system due to changing conditions of the Ohio River. The UV Disinfection Treatment facility protects public health against emerging microorganisms and also continues to be reaffirmed as a “best available treatment technology.”



RMTP UV Disinfection Facility

GCWW has a world-class laboratory necessary to ensure safety of the water supply. The laboratory is divided into four sections: wet chemistry, microbiology, organics, and metals. Analyses of a variety of water quality parameters are performed in-house for samples collected from source waters, both treatment plants, and the distribution system.

RMTP Metals Laboratory

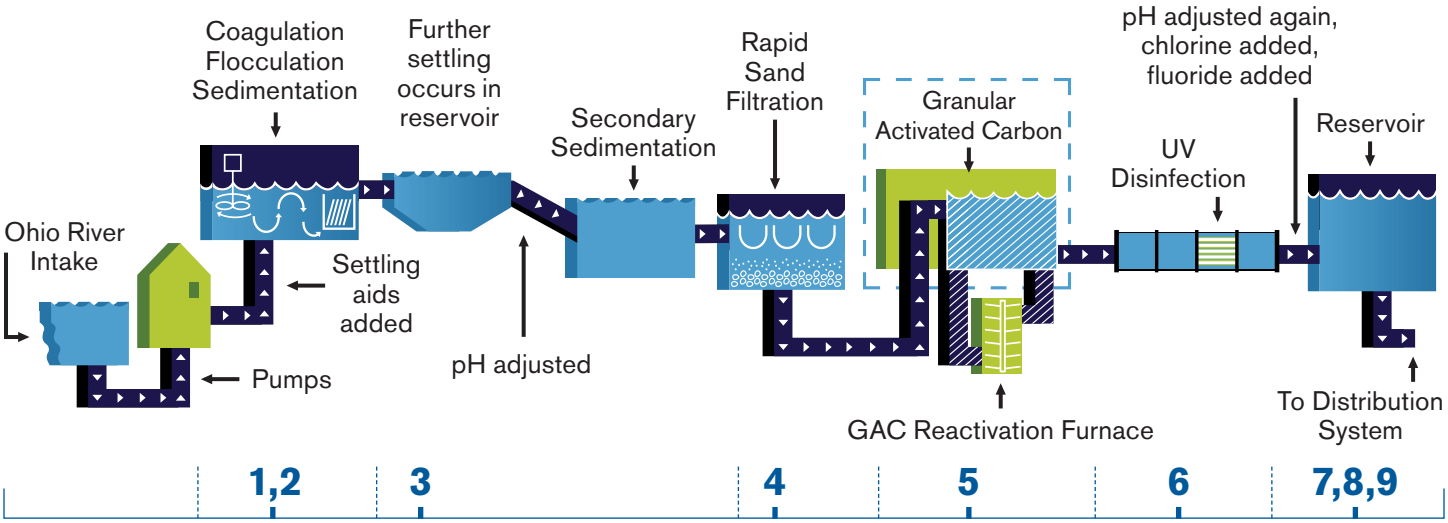
RMTP Treatment Process

SOURCE WATER

RMTP supplies a majority of GCWW customers and draws its water from the Ohio River. The Ohio River is a main artery for transport and a location of seasonal recreation. While the amount of water that flows past Cincinnati varies year-to-year, GCWW generally uses far less than 1%.

As with all surface waters, the Ohio EPA has classified the Ohio River as highly susceptible to potential contamination. Chemical spills, sewage discharges, agricultural, rural, and urban runoff, mining and other activities all have the potential to influence the water. For this reason, GCWW has adopted a multi-barrier approach to ensure safe and effective water treatment.

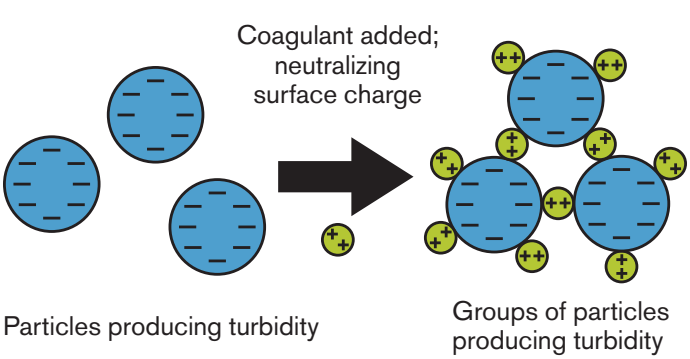
1. **Coagulation and Flocculation**
2. **Sedimentation**
3. **Secondary Sedimentation**
4. **Rapid Sand Filtration**
5. **Granular Activated Carbon**
6. **Ultraviolet Disinfection**
7. **Chlorine Disinfection**
8. **Fluoridation**
9. **Corrosion Control**

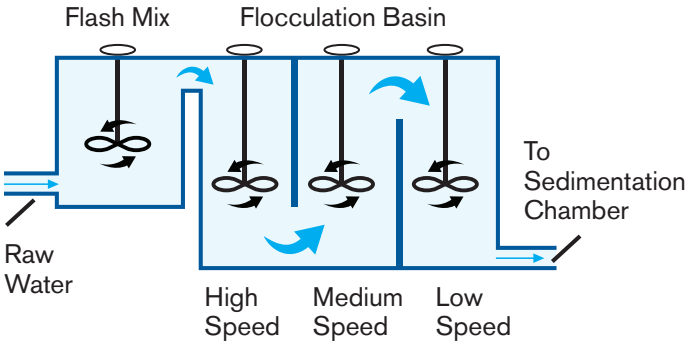


1. COAGULATION AND FLOCCULATION

Coagulation and flocculation are the first set of treatment steps after the water is pumped from the Ohio River. They are conventional chemical and physical techniques used to remove silt, clay and other suspended solids from surface water.

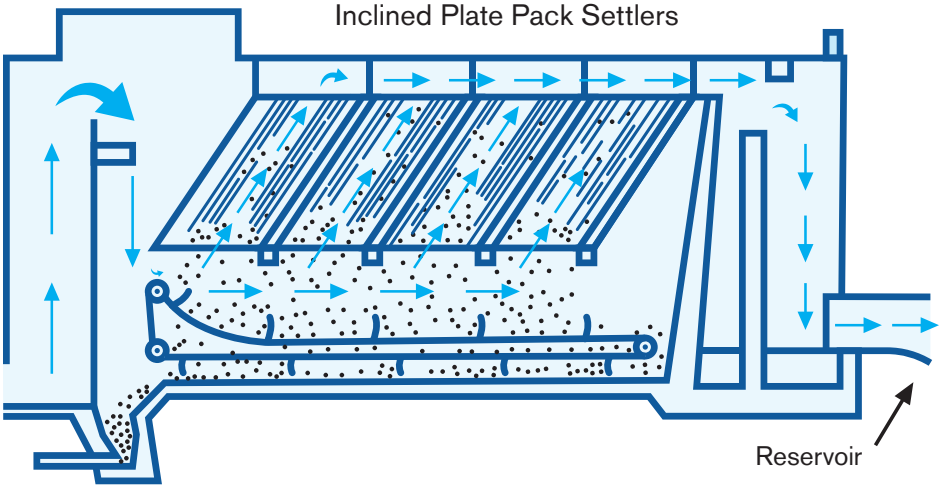
Coagulation is the addition of treatment chemicals that prepare these very small particles to group together. Flocculation is physical movement that helps the particles stick together, forming larger clumps which can then settle out of the water.





2. SEDIMENTATION

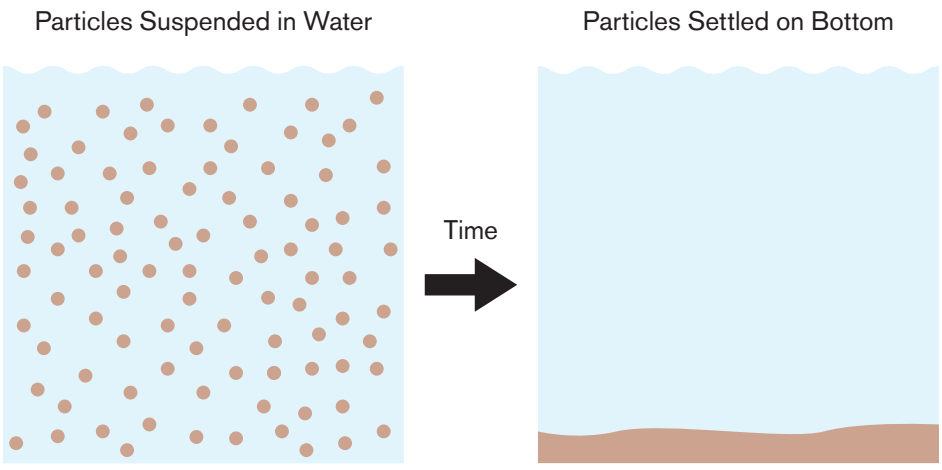
In sedimentation, larger clumps formed during flocculation settle to the bottom and are removed from water. This is achieved using inclined plate pack settlers. The inclined plate settlers allow particles to settle much more quickly in a much smaller area than traditional sedimentation.



3. SECONDARY SEDIMENTATION

After sedimentation, water then flows into two open reservoirs where secondary sedimentation takes place. The RMTP settling reservoirs were constructed in 1907 with a combined capacity of 330 million gallons. After coagulation, flocculation, and sedimentation, 95% of the river solids are removed. This ensures effective water treatment in the rest of the treatment processes.

The settling reservoirs also provide emergency water storage for GCWW in the event of a spill in the Ohio River. During a river spill, pumping of the river water can be stopped until the spill passes the plant intakes while water is used from the settling reservoirs. This helps to ensure an uninterrupted supply of water to customers without risking contamination from the spill.



4. RAPID SAND FILTRATION

Rapid sand filtration, GAC and UV treatment processes create the core of the multi-barrier approach to protecting public health. Filtration is one of the original treatment processes used at RMTP since its construction in 1907. Rapid sand filters are used to remove suspended particles that have not been settled and removed during sedimentation. Water flows down through the filter media under gravity and the particles are trapped in the sand. Beneficial microbes in the sand also improve the efficiency of treatment for many substances.

Rapid Sand Filtration Model

The filter building has been expanded over the years and currently houses 47 rapid sand filters. Major parts of a rapid sand filter include the filter sand, gravel support bed, underdrain system, and wash water troughs. At RMTP, each filter can filter 6 Million Gallons per Day (MGD) and the annual average turbidity of water leaving a filter is less than 0.15 turbidity units (NTU) (regulations require that this never exceed 1.0 NTU).

5. GRANULAR ACTIVATED CARBON

GCWW was one of the first utilities in the United States to apply Granular Activated Carbon (GAC) technology to a large-scale drinking water treatment process. This state of-the-art technology uses activated carbon, which contains numerous microscopic cavities. The GAC acts like a firm sponge with a sticky surface and, when water passes through it, chemicals and other impurities adhere to the carbon. This process, called “adsorption,” removes the chemicals from the water.

There are twelve GAC filters, called contactors, in RMTP and they were placed into service in 1992. Benefits of GAC include: barrier against chemical spills in the Ohio River; barrier against natural impurities in raw source water; less chlorine required for disinfection; reduced disinfection-byproducts; and reduced tastes and odors in the water.

RMTP is one of only a few water treatment plants in the nation that incorporates GAC adsorption into its water treatment process with on-site reactivation. On-site reactivation is the process used to clean and recycle the carbon once it has removed enough contaminants. This thermal reactivation process involves heating the carbon in large furnaces devoid of oxygen and using steam to destroy the chemicals which have become attached to the carbon. Once the carbon goes through this process it can be re-used.

The GAC Treatment Facility is named in recognition of Frank Harris, Sr., a longtime labor union leader, GCWW employee, and former president of Local 240 of the American Federation of State, County, and Municipal Employees (AFSCME). Mr. Harris served on the staff of AFSCME Ohio Council 8 for over a decade and later managed the Ohio AFSCME Care Plan, a health insurance coverage for public employees.

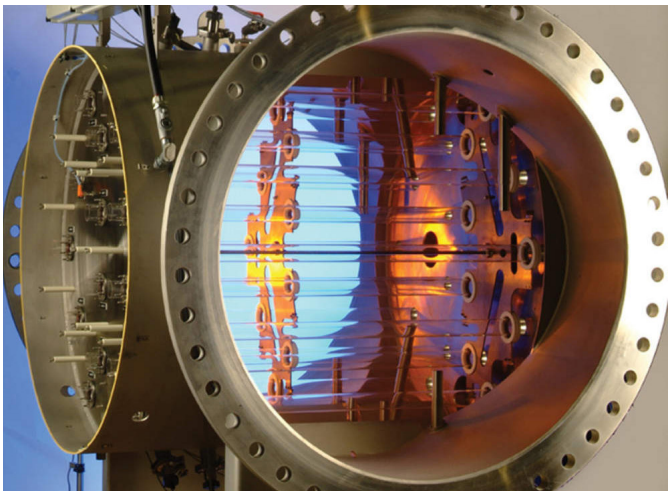
Granular Activated Carbon (GAC)

GAC Adsorption

6. ULTRAVIOLET DISINFECTION

UV disinfection is one of the most effective methods used to protect against chlorine resistant microorganisms such as Cryptosporidium. UV light occurs naturally and does not affect the taste, color or pH of water during treatment. These UV rays are just like the ones the sun produces but are generated from high-intensity light bulbs for water treatment.

The UV disinfection facility contains eight medium pressure UV units. Each unit contains five 20 kW nominal-power lamps that emit rays of intense UV light which shine through the water creating a disinfection process.



UV Reactor - Manufactured by Calgon Carbon Corporation©

DID YOU KNOW?

Where'd We Get the Names?

RICHARD MILLER AND CHARLES M. BOLTON

RMTP is named after Richard Miller, Director of GCWW from 1976-1992. Throughout his 43-year career, he distinguished himself as an effective leader, was recognized through numerous national awards, and was elected president of the American Water Works Association (AWWA). Mr. Miller directed the research, financing, design and construction of the innovative GAC facility as a capstone to his career and lasting legacy to the community. CMBP is named after Charles M. Bolton, Director of GCWW during an era of unprecedented expansion from 1956-1976.

7. CHLORINE DISINFECTION

Chlorine disinfection acts as a supplement to UV disinfection. It is the process of adding chlorine to drinking water to kill viruses, bacteria and other disease-causing organisms. The application of chlorine and maintaining of chlorine in the distribution system are required by federal and state laws to ensure water stays safe all the way to the customer tap. GCWW monitors the chlorine levels throughout the system to ensure the chlorine is maintained within a safe range.

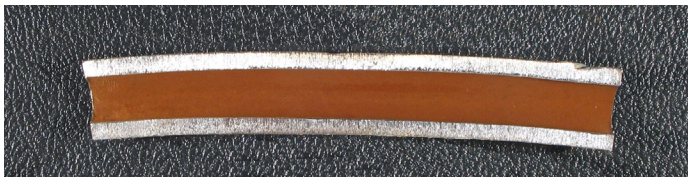
8. FLUORIDATION

Fluoride is added to the water to protect teeth from cavities. This is required by a state law passed in 1969. According to the American Dental Association, persons who drink fluoridated water have a 20% to 40% reduction in the number of cavities that would have occurred without fluoride. At RMTP, fluoride is added to the water to maintain the fluoride residual within the legally required range.

9. CORROSION CONTROL

GCWW treats the water specifically to minimize the amount of metals (such as lead and copper) that may leach into the drinking water. This treatment process is called corrosion control, and reduces the chance that lead and copper will be picked up from home plumbing.

Corrosion control is achieved at RMTP by adjusting the water chemistry, including control of the pH, alkalinity, and chlorine. These water chemistry adjustments work together to form a protective barrier covering surfaces containing lead and copper. GCWW collects water samples to ensure the corrosion control is working properly.



Example of Protective Barrier Formed by Corrosion Control (Photographer: Mike DeSantis, USEPA)

WATER QUALITY MONITORING

GCWW personnel monitor water quality extensively throughout RMTP by collecting hundreds of samples each day, and by using automatic monitors. Modern, continuous monitors for chlorine, turbidity, fluoride and pH levels assist in uninterrupted production of high-quality water.

Operational requirements and research result in over 100,000 laboratory analyses performed annually to ensure safe water and cost-effective treatment.

Charles M. Bolton Treatment Plant

HISTORY

Charles M. Bolton Plant (CMBP) was constructed in 1976 to add capacity, security, and position GCWW for future growth. The Federal-Aid Highway Act of 1956 and resulting plans for a circle freeway (I-275) dramatically changed the pattern of growth in the northwest section of the GCWW service area. Whereas growth was previously on the outside edges of the urban area, new plans for the freeway triggered large developments near the planned route. This included Springfield and Colerain Townships as well as the unincorporated areas within these general limits.

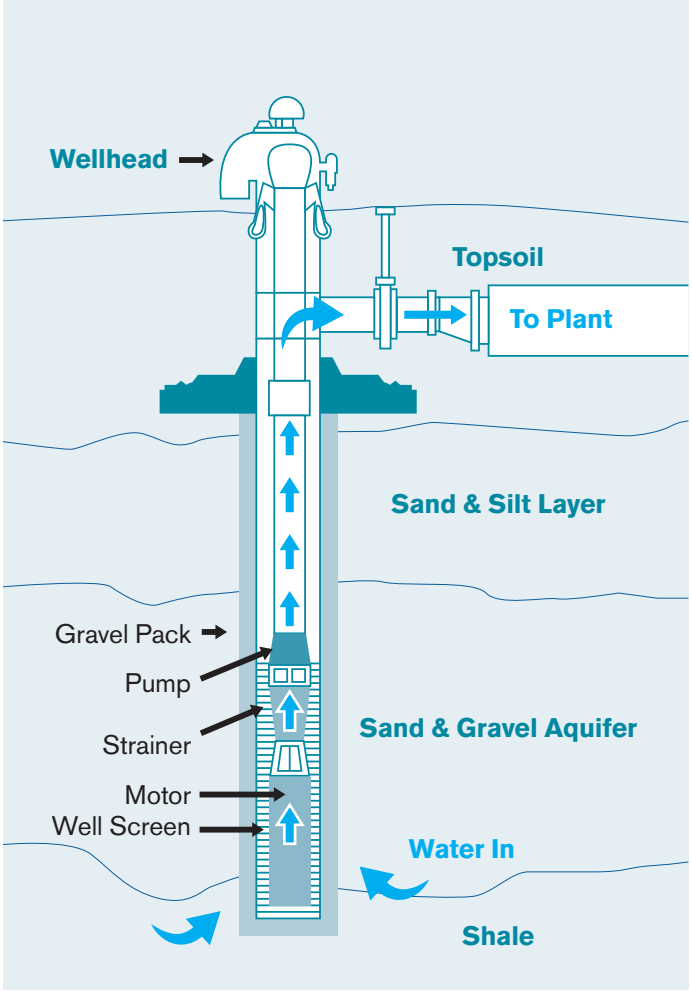
Forecasts made on a population growth study of the Cincinnati area resulted in amending the GCWW expansion program adopted in 1954. Two plans were designed and compared. One plan suggested enlarging RMTP and incorporated the cost of new and larger water mains to Springfield and Colerain Townships. The second plan proposed building a new treatment plant along the Great Miami Buried Valley Aquifer. This second plan was estimated to cost only eighty percent of the first and provided additional water security to the GCWW area. Cincinnati City Council approved this second plan in 1961.

Although preliminary planning and drilling for the water wells began in the 1960's, due to legal challenges, the plant was not completed until 1976. The legal challenges resulted in the formation of the Hamilton to New Baltimore Ground Water Consortium, a long-standing and effective organization which protects the ground water in the Hamilton-Fairfield area. The Consortium is discussed further in the Source Water Protection section of this guide.

CMBP Treatment Process

SOURCE WATER

The plant provides water to GCWW customers primarily in Northwest Hamilton County, but can serve a much larger portion of GCWW's distribution system if needed. It also serves as an additional source of water should there be a large chemical spill in the Ohio River. A total of 13 wells have been installed into the Great Miami Buried Valley Aquifer and can furnish up to 40 MGD of water to the plant for treatment (refer to the image on the next page). The wells are an average depth of 120 feet and utilize submersible motors, having the electric motor and pump near the bottom of the well column.

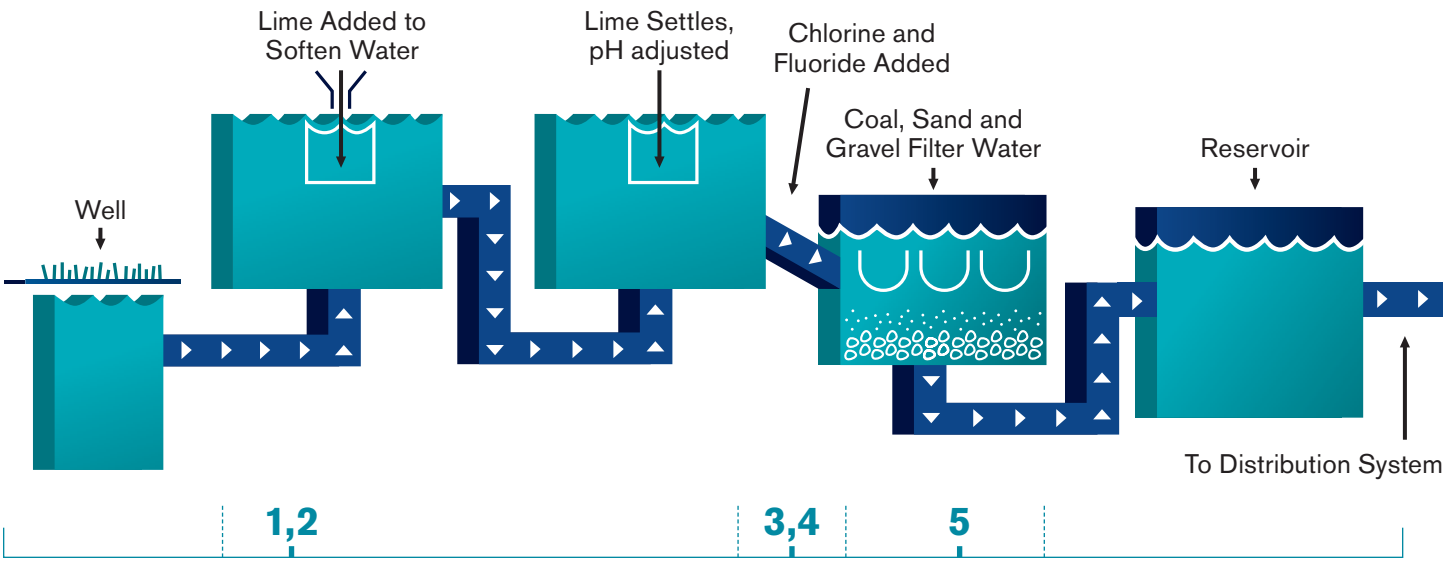


Production Well

Sample Collection

The ground water supply for CMBP is plentiful and of very high quality. Because of the excellent water quality, the treatment process does not need to be as complex as at RMTP. The specific treatment processes for the CMBP are described as follows:

1. **Softening**
2. **Corrosion Control**
3. **Disinfection**
4. **Fluoridation**
5. **Dual Media Filtration**



CMBP Solids Contact (Softening) Basins

1. SOFTENING

Because the ground water source is high in calcium and magnesium, it is considered very hard water. The hardness of the ground water is about 300 mg/l per liter or 17 grains per gallon. About half of this hardness is removed through a treatment process called softening, which removes part of the calcium. While hardness is not a health concern, GCWW customers prefer a moderately hard water which does not cause excess scaling in water fixtures, water heaters, and increases the effectiveness of soap. The raw water is softened and settled in the four solids contact (softening) basins.

Calcium Oxide in the form of hydrated lime is used to soften the water. It is introduced to the primary solids contact basins to reduce the hardness. The hydrated lime raises the pH of the water and begins the chemical reaction forming calcium carbonate, which will settle out and thus reduce the hardness of the water. GCWW does not remove all hardness from the water because not only would it increase the cost of the water, it would also make the water corrosive - damaging our customers' plumbing and producing water quality problems.

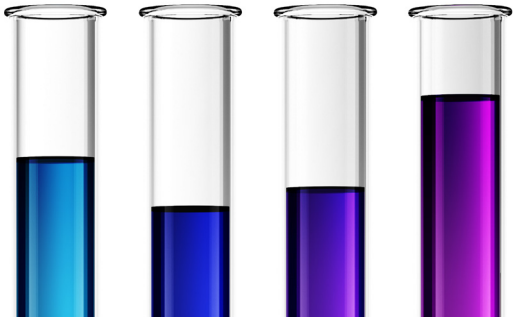
As the calcium carbonate is formed in the softening basins, is settles to the bottoms of the basins and is removed to storage lagoons. These residuals can then be used on farm fields to adjust the soil chemistry, which allows better crop growth.

2. CORROSION CONTROL

At CMBP, corrosion control is achieved by adjusting the water chemistry, including control of the pH, alkalinity, and chlorine. These water chemistry adjustments work together to form a protective film covering surfaces containing lead and copper. This minimizes the release of lead and copper to the water. In addition to these adjustments, sodium hexametaphosphate (NaHex) is added as a sequestering agent to reduce calcium carbonate build-up in the filters and filter pipes. GCWW collects water samples to ensure the corrosion control is working properly.

3. DISINFECTION

Chlorine disinfection is the process of adding chlorine to drinking water to kill viruses, bacteria and other disease-causing organisms. The application of chlorine and maintaining of chlorine in the distribution system are required by federal and state laws to ensure water stays safe all the way to the customer's tap. GCWW monitors the chlorine levels throughout the system to ensure the chlorine is maintained within a safe range.



4. FLUORIDATION

Fluoride is added to the water to protect teeth from cavities. This is required by a state law passed in 1969. According to the American Dental Association, persons who drink fluoridated water have a 20% to 40% reduction in the number of cavities that would have occurred without fluoride. At CMBP, fluoride is added to the water to maintain the fluoride residual within the legally required range.

5. DUAL MEDIA FILTRATION

After the water is softened and treated with chlorine and fluoride, the water passes through dual media filters. These eight filters contain sand and anthracite (a form of crushed coal), and remove any remaining calcium carbonate which did not settle in the softening basins. The filter beds are constructed of vitrified filter blocks, layers of gravels, coarse sand, fine sand and anthracite and can filter five MGD each. Periodically, the flow in the filters is reversed and the filter media are cleaned in a process called backwashing.

CMBP Dual Media Filtration

Testing Hardness

WATER QUALITY MONITORING

The quality of the water produced is monitored constantly by continuous monitors for chlorine, turbidity, fluoride and pH. GCWW laboratory staff also perform a wide range of analyses from the production wells and the treatment plant to ensure production of the highest-quality water possible. Results from untreated and treated water can be found in our customer water quality reports and on our website.

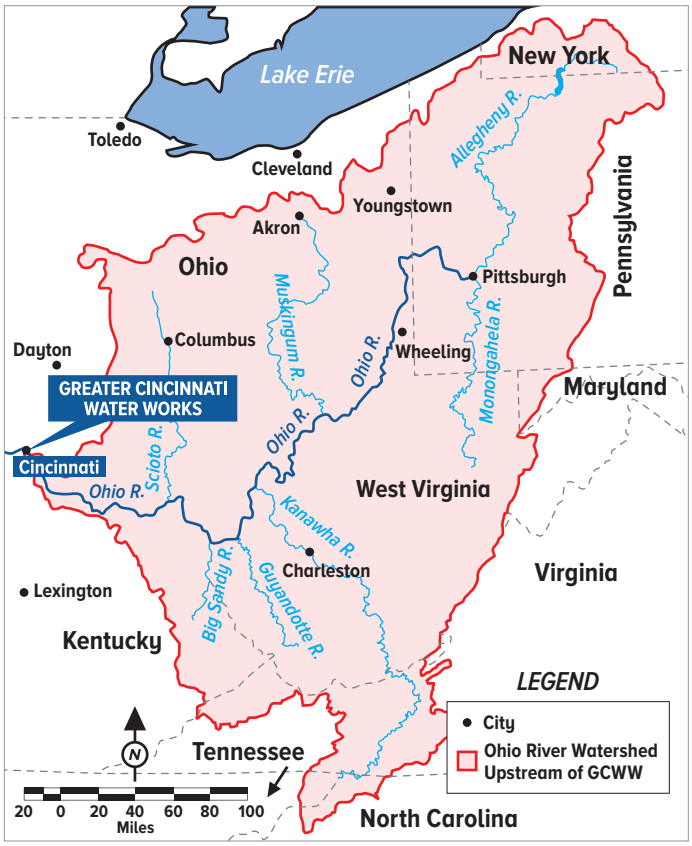
Sources of Your Drinking Water

The sources of drinking water, both tap and bottled, include rivers, lakes, streams, ponds, reservoirs, springs and wells. The majority of GCWW water is obtained from the Ohio River with the remainder coming from the Great Miami Buried Valley Aquifer, which is a ground water source.

THE OHIO RIVER: A ROBUST AND PLENTIFUL WATER SOURCE

The Ohio River is 981 miles long from its beginning at the confluence of the Allegheny and Monongahela Rivers in Pittsburgh, Pennsylvania to its ultimate confluence with the Mississippi River in Cairo, Illinois. The GCWW intake, where the water is pumped from the river to the treatment plant, is located approximately halfway down the river, southeast and upstream of downtown Cincinnati and the Little Miami River. The portion of the Ohio River watershed upstream of GCWW is approximately 71,000 square miles and includes portions of nine states including significant portions of Ohio, West Virginia, Kentucky and Pennsylvania as well as smaller portions of New York, North Carolina, Maryland, Virginia, and Tennessee.

The Ohio River was formed as the result of glacial advances across the northern portion of Ohio starting approximately one million years ago until the final glacial retreat 15,000 years ago. Prior to the formation of the Ohio River, this area was drained by the Teays River, which flowed from North Carolina northwest across West Virginia and Ohio. As thick glaciers advanced across Ohio the Teays River was blocked, forming a large lake that covered much of southern Ohio. The banks of that lake eventually breached, and water emptied toward the southwest forming the earliest course of the modern Ohio River and completely abandoning the former Teays River.



Ohio River Watershed Upstream of GCWW Intake

Left in its unmodified state, the Ohio River would be much shallower and not nearly as wide as the current river. The river was modified from its natural state by the installation of 51 locks and dams along its course during 1910-1929. It was again modified by the consolidation and replacement of those locks and dams in the 1950's. The 20 dams that exist today, which are operated by the U.S. Army Corps of Engineers, deepened and widened the river to allow for consistent navigation and barge traffic. The navigability of the river drew industrialization and several stretches of the river include dense population centers and heavily industrialized corridors. These dams also ensure a plentiful water supply for GCWW and the people of Cincinnati.

With all the various uses of the river and the number of people that live within its watershed, it's no surprise the water quality can be affected by human activities and industrial chemicals. GCWW has been using the Ohio River to supply safe and great tasting drinking water for Cincinnati for over 100 years and the treatment techniques described in other sections of this document are specifically designed to meet the challenges of using a working river, like the Ohio, as a source of drinking water.

THE GREAT MIAMI BURIED VALLEY AQUIFER

The current Great Miami River meanders 162 miles from its start at Indian Lake, in Logan County, Ohio to its confluence with the Ohio River west of downtown Cincinnati. The age of the Great Miami River valley is millions of years old as the river formerly flowed northward toward the Teays River. When the advancing glaciers blocked and destroyed the Teays River, the flow in the Great Miami reversed as the water from the melting glaciers flowed south, carrying with it the gravel and sand from the melting ice sheet. The sand and gravel filled in the old river valley to a depth of 200 to 250 feet and brought the Great Miami River to its current elevation. These sand and gravel deposits are naturally porous and form the Great Miami Buried Valley Aquifer that we use as a source of water for the Charles M. Bolton Plant.

Much like the Ohio River, the Great Miami Buried Valley Aquifer is a robust and plentiful water source but, because it is relatively shallow and does not have thick clay layers to protect it from contaminants at the surface, the aquifer is highly susceptible to both natural and manmade contaminants.

DID YOU KNOW?

Protecting Your Drinking Water

Due to the susceptibility of each water source to contamination, GCWW actively participates in two regional collaborative Source Water Protection Programs - one for the Ohio River (Ohio River Source Water Alliance) and a second for the Great Miami Buried Valley Aquifer (The Hamilton to New Baltimore Ground Water Consortium). These programs are designed to identify and mitigate risks to the drinking water supplies before water gets to the treatment plants. Both programs have been endorsed by the Ohio EPA.

OHIO RIVER SOURCE WATER ALLIANCE

GCWW has partnered with the Northern Kentucky Water District and the Ohio River Valley Water Sanitation Commission (ORSANCO) to form the Ohio River Source Water Alliance (ORSWA) to implement protection programs for the Ohio River.

These activities include identification of possible sources of contamination, both manmade and natural, and designing strategies to mitigate those risks. GCWW also participates in ORSANCO's Organics Detection System, a river-wide water quality surveillance program designed to protect drinking water quality by consistently analyzing for common industrial contaminants.

orswa.org

THE HAMILTON TO NEW BALTIMORE GROUND WATER CONSORTIUM

The Hamilton to New Baltimore Ground Water Consortium is a group of seven public and industrial ground water producers/suppliers in southwest Ohio. The Consortium maintains a network of early-warning monitoring stations, works with facilities that store hazardous substances to minimize the risk of spills, and educates the public on what they can do to protect ground water.

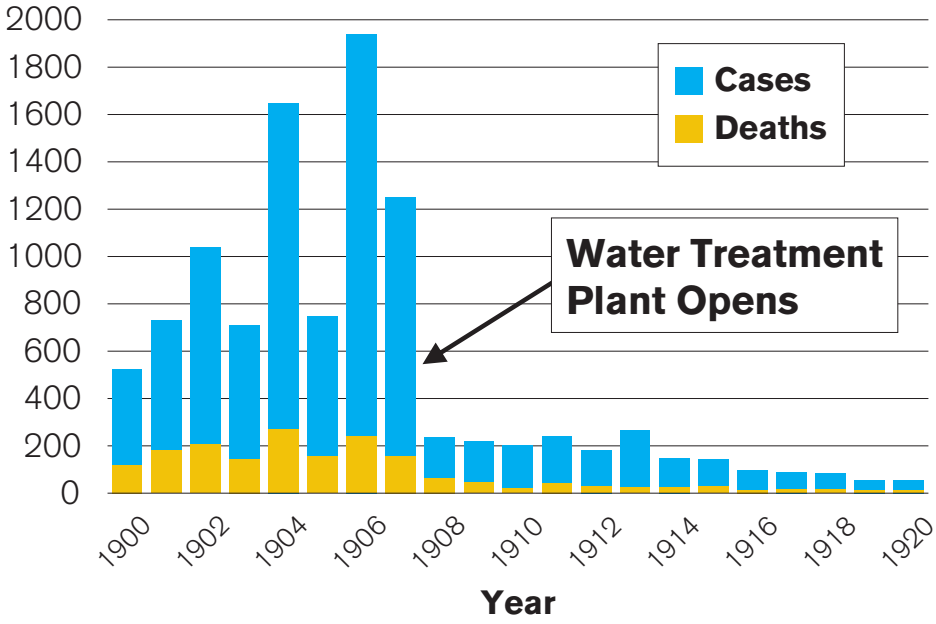
Through activities such as these, GCWW strives to assure future generations a plentiful supply of high-quality water.

gwconsortium.org

Public Health Benefits of High-Quality Water

A safe water supply is critical to protecting public health. Due to the adoption of modern water treatment, water-borne diseases including typhoid and cholera have nearly been eliminated within the United States. The graph illustrates the difference in typhoid cases and deaths in Cincinnati before and after opening the "New Works" (RMTP) in 1907.

INSTANCES AND CASES OF TYPHOID



Only Your Tap Water Delivers These Protective Benefits

PUBLIC HEALTH PROTECTION

A safe water supply is critical to protecting public health. In the United States, there are 18 regulations for water supply and quality which include a total of 94 contaminants. GCWW monitors for these and many more.

WATER SUPPLY PROTECTION FROM SPILLS

GCWW takes great care to protect your water supply from spills into the Ohio River. If needed, GCWW can shut down intakes, utilize stored and supplementary water and allow the spill to pass until GCWW resumes its advanced treatment system to remove contaminants.

FIRE PROTECTION

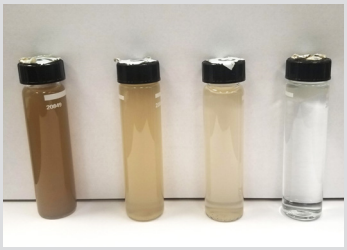
A well-maintained water system is critical in protecting communities from the threat of fire. The same system of water mains, pumps and storage tanks transports water to home faucets and fire hydrants.

DID YOU KNOW?

Turbidity

A KEY INDICATOR OF WATER QUALITY

Turbidity is a measure of relative clarity. As particles such as clay, silt, sand, plant material, bacteria, algae and other microscopic substances decrease within a volume of water through the treatment process, the water has a higher clarity. Water with high turbidity can contain many pathogens and can also impact the effectiveness of certain water treatment processes.



Vials of Samples through the Treatment Process and Decreasing Turbidity

Service Area Map

Most customers receive water from Richard Miller Treatment Plant (RMTP), however, the area highlighted in yellow generally receives water from Charles M. Bolton Plant (CMBP). Areas near the arc may receive water from either and/or both plants.

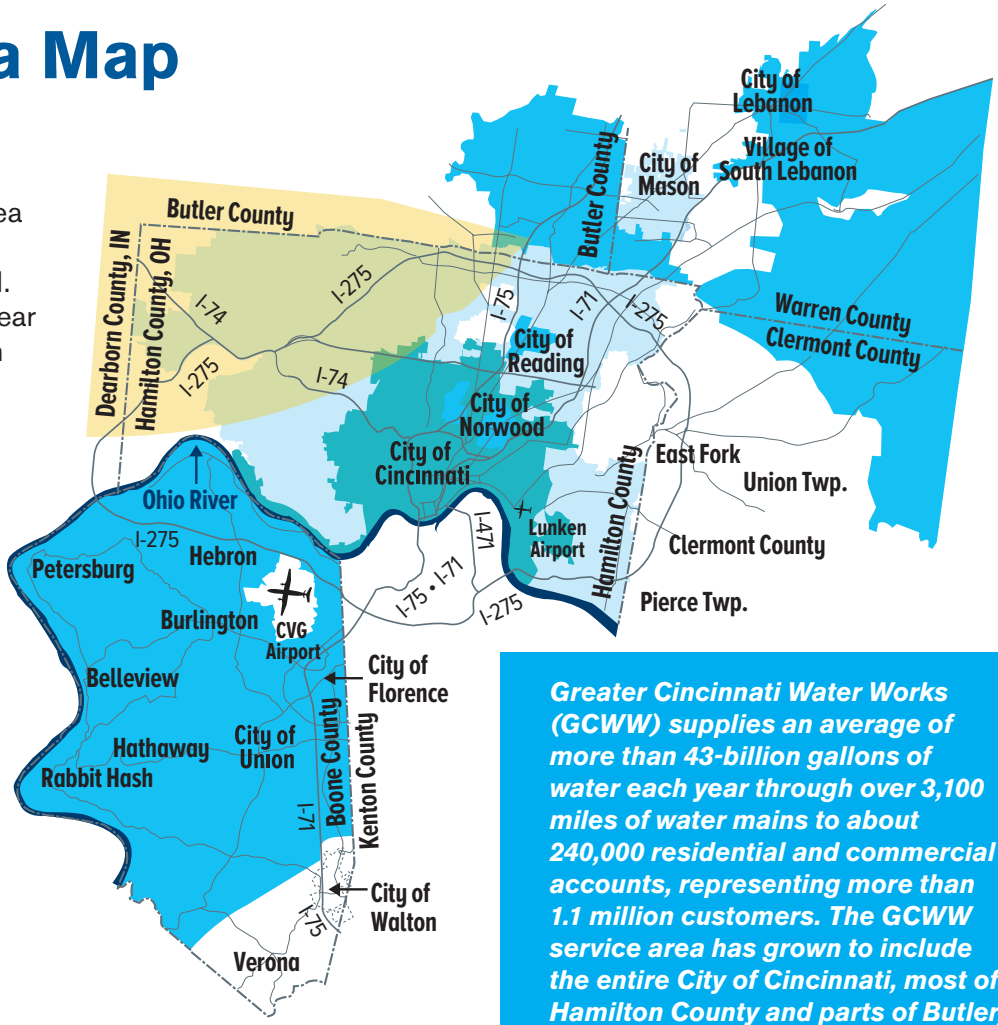
City of Cincinnati (Retail Service Area)

GCWW Retail Service Areas

Wholesale Areas

County Boundaries

Receives Water from CMBP



Greater Cincinnati Water Works (GCWW) supplies an average of more than 43-billion gallons of water each year through over 3,100 miles of water mains to about 240,000 residential and commercial accounts, representing more than 1.1 million customers. The GCWW service area has grown to include the entire City of Cincinnati, most of Hamilton County and parts of Butler, Warren and Clermont Counties in Ohio, and Boone County in Kentucky.

city of
CINCINNATI

Notice Under the ADA
The City of Cincinnati will not discriminate against qualified individuals with disabilities in its programs, services, or activities.
If you require any special accommodations or communication aids visit www.cincinnati-oh.gov/manager/ada.