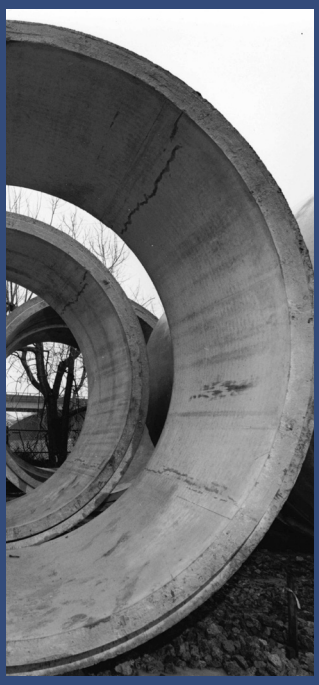

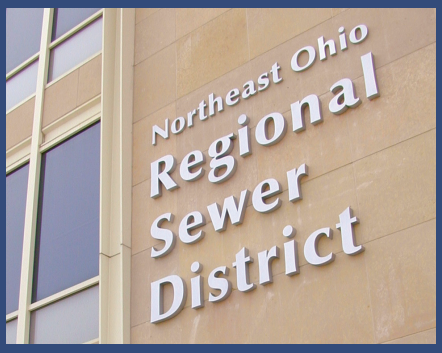

Northeast Ohio Regional Sewer District

OUR HISTORY AND HERITAGE

1972-2007

Northeast Ohio Regional Sewer District

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1972-2007

Northeast Ohio Regional Sewer District:
Our History and Heritage 1972-2007

All images courtesy of the Northeast Ohio Regional Sewer District archives except where otherwise noted.

Printed in the United States by Oliver Printing

A publication of
Communications & Community Relations
Northeast Ohio Regional Sewer District
3900 Euclid Avenue, Cleveland OH 44115

www.neorsd.org

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CONTENTS

Lake Erie

The History of Providing Clean Water in Northeast Ohio

This first section is not just an overview of the District's history, but of wastewater treatment's evolution in greater Cleveland since the city's incorporation in 1836.

At that time, civic leaders were satisfied with discharging raw sewage into Lake Erie and the Cuyahoga River simply to divert it away from public scrutiny.

But as people continued to settle in Cleveland, growing amounts of sewage began to mix with the same water that citizens drew from for drinking. The combination was deadly, causing water-borne illnesses that claimed hundreds of lives. The shocking number of fatalities encouraged the development of the wastewater treatment process, which put an end to the disease and suffering.

The District's debut occurred in a different context, however. In the late 1960s, evidence that Cleveland's industrial prosperity had resulted in environmental neglect reached a breaking point. Burning rivers were only one sign of society's collective abuse of area waterways. Water quality deteriorated to the point that it could no longer be ignored. Under these circumstances, the Northeast Ohio Regional Sewer District was created.

Construction at Southerly, 1951

Where there is water, there is life; a great industrial city is born

The Cuyahoga River and Lake Erie were the two primary features that led Moses Cleaveland to stake land at the mouth of the Cuyahoga in 1796. Along with the low banks, dense forests, and high bluffs, Mr. Cleaveland felt these features presented an ideal location for the capital city of the Western Reserve. Given the extent to which the village of Cleveland developed and prospered, history has proven Mr. Cleaveland an accurate visionary.

The business district of our early city exploited the river, where steamers, schooners, and canal boats exchanged imports and exports. The steel industry took off, and John D. Rockefeller began his oil empire on the shores of Lake Erie. Prosperity ensued, but polluted waters followed close behind.

Aerial view of Cleveland, 1937

Until 1856, most Clevelanders got their water from springs, wells, and cisterns, or in barrels filled with water from area waterways. Then city leaders built a new public water system to supply unfiltered Lake Erie water to a limited portion of the city. Twenty years later, the sewage and filth of a growing city added to the problem of industrial waste, thereby turning the water supply into a health risk. Several times, the intake pipes were relocated farther from the shoreline and sewer outlets to reduce the incidence of typhoid fever and other water-borne diseases, but the benefits of those changes were short-lived.

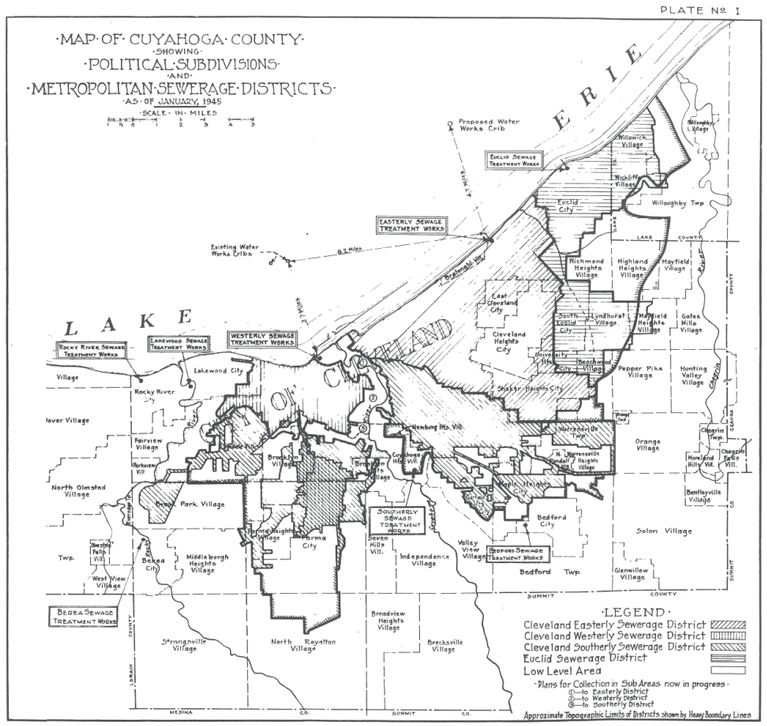
As early as 1881, Mayor Rensselaer Herrick declared Cleveland's riverfront "an open sewer through the center of the city." Despite a lack of public support, there began a series of public works to improve the quality of Cleveland life, including the construction of a public water system and drainage sewers.

One of the first sewer pipes that transported waste to the lake was the Easterly Interceptor (constructed in 1905), which ran parallel to the lake shore. At this time, the Cuyahoga River had 50 sewers emptying into it, along with a large quantity of manufacturing waste.

Lake Erie and the Cuyahoga pay the price

Until 1911, officials intended to ultimately collect sewage from the entire city in the Easterly Interceptor and discharge it into the lake, untreated. In 1911, city officials seriously considered the lake's future. They had doubts about the economy and wisdom of transporting sewage many miles from the westerly and southerly portions of the city to the main easterly outlet, especially if the sewage required treatment. They hired R. Winthrop Pratt to conduct a study of water supply and sewerage for the area. As a result of the study, they decided to collect and treat sewage and industrial waste from four general districts: Westerly, Easterly, Southerly, and Low Level. These districts were the forerunners of today's Westerly, Easterly, and Southerly service areas.

City officials decided to test the various methods of sewage treatment. Accordingly, the Easterly Sewage Testing Station was established on the shore of the lake, next to the Easterly Interceptor outlet. Officials wanted to use this test site to determine the most effective method of treating the sewage so it could be safely discharged into the lake without causing unsanitary and unsightly conditions. Processes tested included hand-cleaned bar screens, grit chambers, sedimentation basins, roughing and trickling filters, and sludge treatment tanks.



Map showing Cuyahoga County's "Political Subdivisions and Metropolitan Sewerage Districts," 1945

Design and construction of full-sized preparatory works with chlorination facilities and a second submerged outfall for Easterly began in 1919. The plant was completed and began operation in 1922. That same year, the Westerly Wastewater Treatment Plant began operating as a primary treatment facility, followed by the Southerly Wastewater Treatment Plant in 1927. By 1930, Westerly and Southerly had been upgraded to provide higher levels of treatment, and the Easterly plant had become the subject of additional studies. With the intake for the proposed Nottingham water filtration plant just four miles from Easterly's outfall, considerable improvement in the plant's treatment capacity was necessary. The result was upgrading Easterly to become Cleveland's first activated sludge plant, which went online in 1938.

Because Easterly was adjacent to the affluent community of Bratenahl, sludge from the plant was pumped to the Southerly plant for treatment. A 13-mile pipeline that ran under the City of Cleveland transported the sludge from Easterly to the Southerly plant. The treatment plants were further upgraded and expanded through the years, with major improvements at Westerly in 1932, 1937, and 1956, and upgrades to Southerly in 1930, 1938, 1955, and the early 1960s. Because of the comprehensive nature of its initial design, Easterly remained substantially unchanged until the late 1970s.

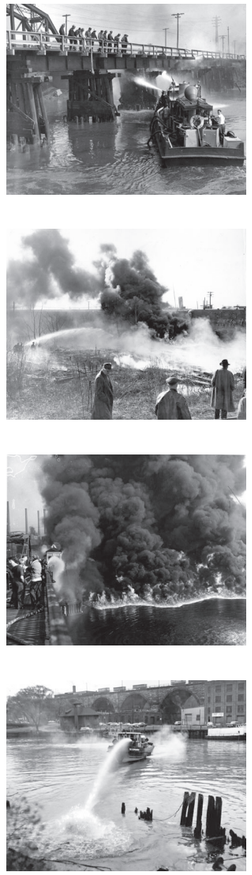
Despite these improvements over the next four decades, not enough was done to adequately treat wastewater in a booming industrial city. Compounding matters, no industrial discharge regulations existed. The increased production and use of persistent toxic chemicals during and after World War II raised environmental concerns beyond those that accompanied the industrial and sewage pollution of earlier years.

Forewarned by Rachel Carson's 1962 book *Silent Spring*, which stated that chemicals such as DDT accumulate in the food chain and cause reproductive and developmental health defects, local members of the League of Women Voters helped form the league's Lake Erie Basin Committee in 1963 to educate the public about such threats. Nevertheless, during the 1960s and early 1970s, the cumulative effects of neglect reached a new low.

The infamous river fire sparks environmental awareness and the birth of the District

Then, on June 22, 1969, it happened. After enduring years of abuse, the Cuyahoga River caught fire and thrust Cleveland into the national spotlight. Ironically, the 1969 fire was benign compared to previous incidents—a 1912 blaze that killed five men and a fire in 1952 that resulted in $1.5 million worth of damage to surrounding structures and water vessels. Comparatively, the 1969 fire on the Cuyahoga caused just $85,000 in damage and no fatalities, but timing is everything. In 1969, the Cuyahoga River's burning captured the public's imagination and ignited a growing environmental movement. More than a century after the river's pollution was first noted, it became an international symbol of environmental neglect.

Cleveland Mayor Carl Stokes, a long-time advocate for environmental responsibility, criticized the federal government and vowed to fight for a cleaner river. The August 1, 1969, issue of Time magazine detailed Stokes' fury in an article about the river's burning titled "The Price of Optimism." Even the Federal Water Pollution Control Administration reported that the lower Cuyahoga had "no visible life."



Cuyahoga River fires: 1949, 1951, 1952, and 1961

DISTRICT TIMELINE

1969

Cuyahoga River fire on June 22 focuses national attention on Cleveland's pollution problems.

1970

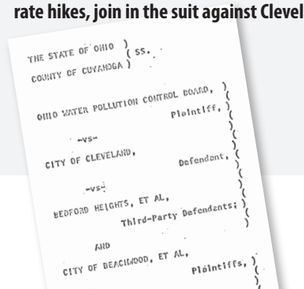
Congress passes the National Environmental Policy Act.

Ohio Water Pollution Control Board (the predecessor of the Ohio EPA) files a court action against the City of Cleveland claiming inadequate and improper disposal of wastewater.

1971

Congress passes the Safe Drinking Water Act.

Suburbs, concerned about pending sewer rate hikes, join in the suit against Cleveland.


THE STATE OF OHIO } ss.
COUNTY OF CUYAHOGA }

OHIO WATER POLLUTION CONTROL BOARD,
Plaintiff,
-vs-
CITY OF CLEVELAND,
Defendant,
-vs-
BEDFORD HEIGHTS, ET AL.,
Third-Party Defendants;
AND
CITY OF BEACHWOOD, ET AL.,
Plaintiffs,

Congress had to do something about the sorry condition of America's water systems. In 1970, a groundbreaking piece of environmental legislation, the National Environmental Policy Act (NEPA), had passed in Congress, helping to establish the Environmental Protection Agency (EPA). In 1972, Congress passed the Federal Water Pollution Control Amendments, which formed the basis for what would become the Clean Water Act of 1977.

The objective of the Act was to restore and maintain the chemical, physical, and biological integrity of the nation's waters. To achieve this objective, the Clean Water Act set two goals. The first was to eliminate the discharge of all pollutants into the navigable waters of the United States by 1985. The second national goal was to achieve an interim water quality that would protect fish, shellfish, and wildlife and recreation by July 1, 1983. Within this framework, Congress gave the EPA administrator the legal tools to help advance water pollution control, while continuing to recognize the primary rights and responsibilities of the states to prevent, reduce, and eliminate pollution.

It was in this national context that the Northeast Ohio Regional Sewer District was created—but local politics and government also played a formative role in the District's birth.

Local influences leading to the District's creation

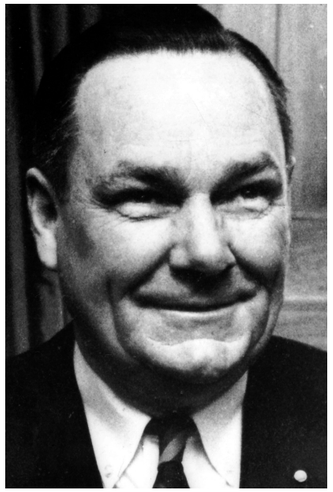
The City of Cleveland, which owned the three treatment plants and the major interceptors conveying sewage to them, had begun charging connected communities for sewage treatment in 1938 to help pay for improvements. Cleveland charged suburban customers higher rates, reasoning that the suburbs were benefiting most from the expanding sewer system.

Over time, the suburbs complained about the price inequity. In the late 1960s, the State of Ohio began to demand improvements to the city's sewage disposal operation to reduce pollution in the Cuyahoga River and Lake Erie.

The suburbs owned their local sewage collection systems, most of which fed into Cleveland's interceptors. Several of them refused to pay for their share of improvements unless Cleveland relinquished their rate-setting and absolute control over sewage disposal. Some suburban communities believed they weren't getting good service from Cleveland and were no longer willing to have their residents pay the higher rates. The treatment facilities owned by the city continued to decline, accelerated by the overall lack of revenue needed to make improvements.

This lack of action by the City of Cleveland and the suburbs resulted in the inability of the Division of Water Pollution Control (a department within the City of Cleveland) to adequately treat wastewater flows in the area, which, in turn, posed a threat to the environment and created problems with the new federal laws and regulations. To prompt action from the city, the Ohio Water Pollution Control Board (OWPCB, later replaced by Ohio EPA) issued a ban on new sewer connections in the City of Cleveland. The City refused to enforce the sewer ban, and the stage was set for confrontation.

On September 3, 1970, the dispute resulted in a lawsuit filed in Cuyahoga County Common Pleas Court. The suburbs and OWPCB challenged Cleveland's control of the system and its adequacy. OWPCB charged that the City of Cleveland was inadequately treating wastewater at its three facilities, thereby polluting waters of the state. It was also alleged that the city had failed to complete improvements to these facilities and had refused to enforce OWPCB's sewer ban. Cleveland contended that these problems were caused by the increased sewage flows to its plants resulting from growth in the suburban communities, not the city. Cuyahoga County Common Pleas Court Judge George J. McMonagle ordered an injunction in late 1970, and set a hearing for December 1, 1971.



Judge George J. McMonagle in an undated photo, courtesy of the McMonagle family

Also in March 1971, several of the suburban communities filed suit against the City of Cleveland, contesting sewage service rate increases proposed by the City to fund improvements required by the OWPCB. The case was consolidated with the case filed by the state on Cleveland's motion that the suburban communities be joined as parties in the OWPCB's action. The judge extended the sewer ban to include the suburbs. The court then consolidated the two cases and held hearings to resolve the problems at hand.

Erwin J. Odeal, who was present as an observer for an environmental agency called Three Rivers Watershed District, recalls, "McMonagle got hold of it and really pushed the case along." After a hearing, the judge decided the matters before the court should be tried shortly thereafter during a two-week trial that included testimony from the Governor's office, Attorney General of Ohio, United States EPA, OWPCB, Regional Planning Commission, Three Rivers Watershed District, Cuyahoga County Commissioners, Citizens League, and a number of other professional organizations and citizen action groups.

1972

Federal Water Pollution Control Amendments (which lead to the 1977 Clean Water Act) pass to improve water quality.

Ohio EPA established.

United States and Canada sign the Great Lakes Water Quality Agreement.

1973

Judge George J. McMonagle's April 4 court order outlines the formation of the Cleveland Regional Sewer District (CRSD).

Bonds sold for $29.8 million to purchase three treatment plants and large interceptor sewers.

Board of Trustees' first meeting in July.

District receives first federal construction grant.

Construction of Northwest Interceptor begins.

CRSD moves to 801 Rockwell Avenue.

1974

District takes over Sewer Control and Industrial Waste departments from City of Cleveland, as well as operation of Beech Hill, Bonnieview, and Wilson Mills pump stations.

President Ford signs the bill creating the Cuyahoga Valley National Recreation Area.

1976

District's combined sewer overflow (CSO) control system is monitored and operated by a "computer-based real-time data acquisition system" for the first time.

District assumes control of Laboratory Services at 3090 Broadway Avenue.

First bond sale of $33 million.

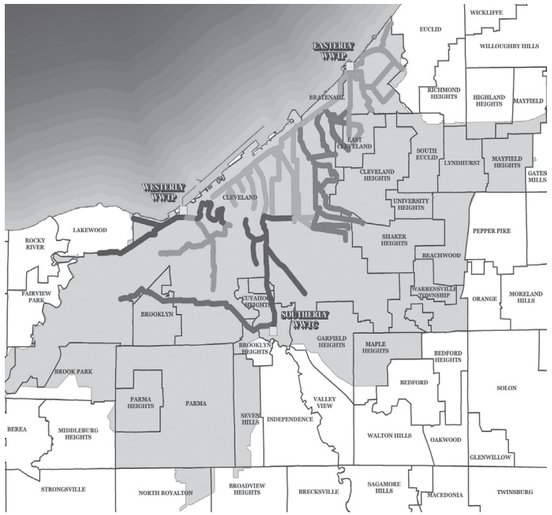
1977

Cuyahoga Valley Interceptor construction begins. The 22-mile-long interceptor carries flow to Southerly upon completion in 1984.

Clean Water Act.

Armed with information from Raymond Kudukis, head of Cleveland Mayor Ralph Perk's transition team and future District Board President, Judge McMonagle advised both parties that Chapter 6119 of the Ohio Revised Code might serve as a model for a regional district. This agency would be governed by its own board of appointed trustees and legal counsel, and would not be directly dependent on any existing governmental entity.

The problem of Cleveland's equity in the treatment facilities and interceptors was then solved when the newly proposed District agreed to purchase them for $29.8 million. This "equitable adjustment" also allowed Mayor Perk to avoid raising municipal income taxes. The timeliness of this financial agreement, combined with the high cost the City would have had to pay for mandated improvements, led to a negotiated settlement.



Cleveland Regional Sewer District Interceptors and Service Area, 1972

Thus, on April 4, 1972, Judge McMonagle ruled that, to best provide for the wastewater treatment needs of Greater Cleveland, steps should be taken to establish a regional sewer district pursuant to Chapter 6119 of the Ohio Revised Code. McMonagle issued a court order instructing the Cuyahoga County Commissioners (as a representative governmental body in the Greater Cleveland area) to file a petition for the creation of a regional sewer district. On June 15, 1972, the Court declared that the Cleveland Regional Sewer District was organized as a subdivision of the State of Ohio.

The Cleveland Regional Sewer District originally served the City of Cleveland and 38 suburban communities. (See page 48.) The purpose of the organization, as described in the original Plan of Operation, was "to establish a total wastewater control system for the collection, treatment, and disposal of wastewater within and without the District."

One of the District's first acts was to assume ownership and operation of the City of Cleveland's three wastewater treatment facilities and the existing interceptor system. The next step was to set up an equitable user charge, dividing the Sewer District into two subdistricts: Subdistrict I (City of Cleveland) and Subdistrict II (suburban communities). Both subdistricts were to pay the same user charges relating to the operation and maintenance of the treatment facilities, interceptor sewers, and combined sewer overflows. Subdistrict II residents were to pay an additional adjustment, which included debt service for the District on bonds issued to pay the $29.8 million settlement with the City of Cleveland, as well as the local portion of the construction of interceptors serving the suburban communities. Subdistrict I residents would pay an adjustment covering construction costs related to interceptors serving only the City of Cleveland.

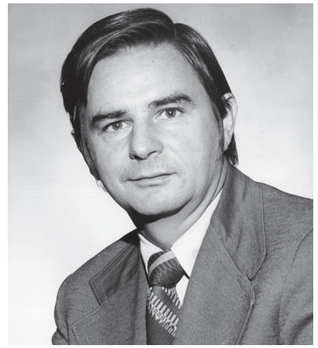
Judge McMonagle was quite a visionary in foreseeing that a regional organization would be the most effective solution to providing wastewater treatment in Northeast Ohio. He had a personal passion for the environment and was a fishing enthusiast who lived by the lake. His dedication to taking care of local waterways was sincere and lifelong.

A seven-member District Board of Trustees representing Cleveland, Cuyahoga County, and the suburbs was given the authority to govern the District and set sewer rates. In addition to ownership of Cleveland's facilities and control over their operation and financing, the District assumed a regulatory role over all industrial sewage discharges in the District to meet EPA requirements.

The District's early days—1972 to 1977

From 1972 to 1974, the District employed very few staff. The Board was appointed in keeping with the court order, and Raymond Kudukis served as the first Board President. In turn, the Board appointed Andrew T. Ungar as the first Director of the Cleveland Regional Sewer District. Along with Ungar, the Board appointed Lucian Rego as General Counsel and Anthony C. Amato as Comptroller (chief finance officer). Thomas W. Cooper was then brought in as the first Chief of Operations, and James P. Harris was hired as Chief Engineer.

These five men served as the first full-time employees of the District, along with Iris Cleveland, who served as Ungar's executive secretary. With the District's upper management firmly in place—and no additional staff—the Sewer District entered into a two-year contract with the City of Cleveland that enabled them to use Cleveland's Operations & Engineering staff.



Andrew Ungar, the District's first Director, 1975

1978

$118.5 million bond sale.

1979

Cleveland Regional Sewer District officially becomes the Northeast Ohio Regional Sewer District.

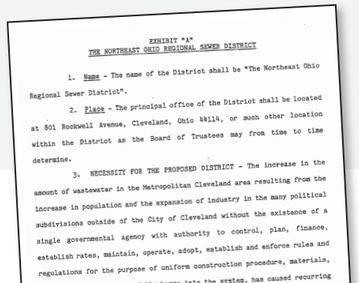


EXHIBIT "A"
THE NORTHEAST OHIO REGIONAL SEWER DISTRICT

1. Name - The name of the District shall be "The Northeast Ohio Regional Sewer District".

2. Place - The principal office of the District shall be located at 801 Rockwell Avenue, Cleveland, Ohio 44114, or such other location within the District as the Board of Trustees may from time to time determine.

3. NECESSITY FOR THE PROPOSED DISTRICT - The increase in the amount of wastewater in the Metropolitan Cleveland area resulting from the increase in population and the expansion of industry in the many political subdivisions outside of the City of Cleveland without the existence of a single governmental agency with authority to control, plan, finance, establish rates, maintain, operate, adopt, establish and enforce rules and regulations for the purpose of uniform construction procedure, materials,

1980

Cuyahoga Valley Interceptor accepts first flow.

1983

District begins development of first Computerized Maintenance Management System.

Northwest Interceptor becomes fully operational.

1985

Construction begins on Heights/Hilltop and Southwest Interceptors.

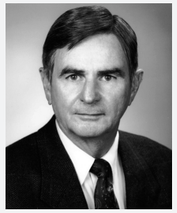
Administration office purchase and renovation.

Ohio EPA approves Pre-treatment Program.

1985-87

Great Lakes Water Quality Agreement is revised, requiring the development of Remedial Action Plans (RAPs) in polluted areas. **The Cleveland Harbor in the shipping channel of the Cuyahoga River is one of 43 areas of concern.**

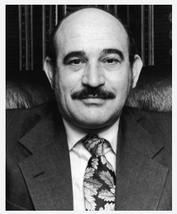
Executive Directors 1972-2007



Andrew T. Ungar served as the District's first Director after its formation in 1972 until 1979. He served on the Board of Trustees from 1997 to 2002.

Mr. Ungar graduated from Ohio University in 1957 with a degree in Civil Engineering and spent two years in the Army Corps of Engineers. He served as Construction Superintendent for the Great Lakes Construction Company before working for the City of Lakewood as Director of Public Works.

Mr. Ungar's accomplishments at the District included the rehabilitation of all three treatment plants with federal grants. He was one of the founding members of the Association of Metropolitan Sewerage Agencies (AMSA), now known as the National Association of Clean Water Agencies (NACWA).



Louis V. Corsi served as the District's Director from 1979 to 1983, part of a career that included over 30 years in government service.

Mr. Corsi attended John Carroll University and received a law degree in 1951 from Cleveland Marshall Law School. Prior to his work with the District, he was appointed by Mayor Dennis Kucinich as Cleveland's Public Utilities Director, having previously served as an administrative aide. Mr. Corsi's other positions with the City included Income Tax Administrator and Commissioner of Parks and Properties. From 1974 to 1977, he served as City Manager of Bedford.

Erwin J. Odeal served the Northeast Ohio Regional Sewer District—first as Director, then Executive Director—from 1983 to 2007. He previously served as Deputy Executive Director for five years, and, before that, as Engineer and Planning Engineer for four years. Before joining the District, Mr. Odeal served as District Engineer for the Ohio Department of Health, and as Engineer for the Three Rivers Watershed District.

Erwin Odeal devoted virtually his entire professional career to environmental planning and management for the benefit of Northeast Ohio. From his early 1970s work in regulating regional watershed planning, to the creation of the Northeast Ohio Regional Sewer District, to the implementation of court-ordered regional projects, and back to the current emphasis on watershed planning, he was a dominant force for progressive action. At the same time, he established day-to-day operation of wastewater treatment facilities as a priority for the agency.

Mr. Odeal earned a Bachelor of Science degree in Civil Engineering from Cleveland State University and a Master of Science degree in Civil Engineering from the University of Akron. He is a registered Professional Engineer in the State of Ohio.

Mr. Odeal is past Treasurer of the Water Environment Federation. He is also past President of the National Association of Clean Water Agencies and past Chairman of the Water Environment Research Foundation.

The Cleveland Regional Sewer District officers spent their first year in an office at the City of Cleveland Public Utilities Building at 1200 Lakeside Avenue. In 1973, they moved to the Rockwell Building at 801 Rockwell Avenue.

Once their contract with Cleveland expired in 1974, the District hired its own staff. They assumed many of their Cleveland employees would join them, but a number decided to seek employment elsewhere. The District proceeded to change job descriptions and increase responsibilities.

In 1974, the District assumed responsibility for the Sewer Control and Industrial Waste departments from the City of Cleveland, prompting a second wave of upper management hiring. Kenneth A. Pew was brought over from the Clean Water Task Force (a city group housed in the Department of Public Utilities and the Division of Water Pollution Control) to manage Sewer Control. Jim Weber was brought over to handle Industrial Waste and Dale F. Patrick was hired as Assistant Chief of Operations. A few years later, Al Santos (who initially served as Deputy Comptroller) became Personnel Manager.

Erwin Odeal, 1983

In 1974, Ungar recruited Erwin J. Odeal from the Three Rivers Watershed District. A young civil engineer, Odeal had extensive knowledge of pollution matters and was instrumental in helping to get the public to understand that "all sewage flows downhill and respects no boundaries."

Throughout these changes, the City of Cleveland continued to provide billing services as it does today, except for a few specific communities.

In 1976, the District finally assumed control of Laboratory Services, which was located at 3090 Broadway Avenue. Alex Balazs became the first District lab manager. William B. Schatz, recruited by Ungar and Lou Rego from the City of Cleveland Law Department, was very knowledgeable about construction law. Once Rego decided to leave, the Board appointed Schatz General Counsel.

Andrew Ungar left shortly before the District moved administrative operations to the Statler Building in 1980. The Board had wanted to divide Ungar's responsibilities and assign him a deputy director. At this point Ungar chose to

The District moved to a new administrative headquarters at 3826 Euclid Avenue in December 1985. Odeal described the renovated building as "centrally located with improved working conditions for employees and greater convenience for the public we serve."

1986

District adopts Title 3 Separate Sanitary Sewer Code.

District begins operating Berea WWTP.

1988

Construction of Environmental & Maintenance Service Center (EMSC) begins.

Computerized Maintenance Management System goes online.

1989

Cuyahoga River Community Planning Organization formed to help with the Remedial Action Plan.

leave, as did Chief Engineer Jim Harris. Charles Vasulka (who would later serve as Director of Engineering & Construction) became Chief Engineer shortly after Jim Harris's departure.

Before Ungar left, however, the Board appointed Lou Corsi as Executive Director and Erwin Odeal as Deputy Director. Corsi had held a number of positions with the City of Cleveland, including Director of Public Utilities. Shortly thereafter, Ken Pew left the District.

Federal money helps the District meet federal mandates

The environmental movement spawned by the burning river created the circumstances for federal funding. As part of the Clean Water Act, grant money was offered to eligible wastewater treatment agencies struggling to make the strides necessary to meet newly implemented water pollution mandates. To secure the grant money, wastewater agencies had to develop detailed, cost-effective plans and environmental studies.

Erwin Odeal, Dale Patrick, William Schatz, Ken Pew, David DeMarco, and Charles Vasulka, 1986

At this time of marked change, the District's professional objectives were taking distinct shape. According to former Deputy Executive Director Ken Pew, "Any discord on the Board didn't impact our work much at all. In fact, it was business as usual. Andy Ungar's main focus was qualifying for federal grant money. His attitude was, 'If the feds have money, we need to figure out how to apply and get it first'." In 1974, Erwin Odeal came in and with his staff further helped secure federal money by preparing the facilities plans and grant applications.

To quality for federal grants, wastewater treatment plants had to present designs and be ready to bid the contracts. The $555.5 million the District received under the U.S. EPA construction grants program (from 1972 to 1990) funded wastewater treatment plant upgrades and new interceptor construction.

Meanwhile, Andy Ungar was building a solid reputation for the District as a governmental agency that paid its bills on time. Ungar proclaimed, "If somebody does work for us, we pay them. We don't jerk them around." His attitude helped the District establish a reputation for paying promptly and attracting contractors.

In contrast, a number of other public entities had a reputation for not paying invoices on time. At this time too, Cleveland's political climate was in turmoil. Mayor Dennis Kucinich was elected and the City defaulted on its bonds. The District wanted to separate itself from the City of Cleveland out of concern for its bond ratings. As a result, in 1979, the Common Pleas Court permitted the Cleveland Regional Sewer District to change its name to the Northeast Ohio Regional Sewer District in 1979.

Around this time, Director Lou Corsi became ill and Erwin Odeal became Acting Director. Corsi retired and passed away in 1983. The Board then formally appointed Odeal Director.

By 1988, the federal government was requiring all wastewater treatment facilities to provide secondary treatment. Deadlines were imposed to keep agencies on track, and all District facilities met the deadline except for Westerly (see page 41). Many large metropolitan area wastewater treatment agencies, particularly those with ocean discharges (such as Miami, San Francisco, and New York) were nowhere near secondary level treatment in 1988 and did not meet the deadline.

The federal grant program came to an end in 1990. While many financial needs remained, it had succeeded in getting wastewater treatment agencies started on the long process of rehabilitating treatment facilities and infrastructure to meet more stringent environmental regulations.

Construction program takes off

It is important to note that design of the Northwest Interceptor, Heights/Hilltop Interceptor (HHI), Cuyahoga Valley Interceptor (CVI), and Lakeview Dam had all been initiated by the City of Cleveland. The Northwest Interceptor was already under construction when the District assumed ownership in 1972, and it was complete by the early 1980s. Construction of HHI and the Southwest Interceptor (SWI) began in the early 1980s and continued through the mid-1990s.

1990

District receives its last federal construction grant.

Heights/Hilltop Interceptor accepts first flow.

$13.5 million EMSC facility opens in Cuyahoga Heights.

1991

First intercommunity relief sewer, Pearl Road, accepts flow.

$122 million bond sale.

Wang computers distributed for the first time to secretarial staff in Administration building.

1992

Cuyahoga River Remedial Action Plan Stage One Report released, summarizing existing pollution problems and sources.

1993

The Ohio and Erie Canal Towpath opens in the Cuyahoga Valley National Recreation Area. The trail parallels 22 miles of the Cuyahoga River.

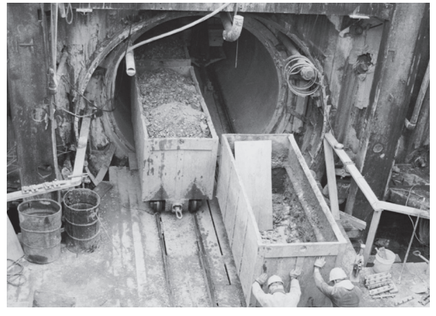
1994

An Ohio EPA survey of the Cuyahoga tributaries shows improving trends in chemical water quality and biological health.

Southwest Interceptor completed.

1995

District begins two-year study focusing on pollution sources in the Mill Creek area.



Mining cars remove debris during construction of the Heights/ Hilltop Interceptor, 1988

Drilling begins on the Southwest Interceptor (Contract 5), 1989

Ken Pew had been gone between 1979 and 1983, but Erwin Odeal invited him back as Chief of Support Services to handle the day-to-day operations of the organization. One of Pew's first responsibilities in 1984 was to work with all the communities that had plants in the CVI service area to connect to the CVI, start billing their customers, and decommission their plants.

After the HHI and SWI had been designed, the EPA required that the District conduct an environmental impact study. The study delayed construction but was required for the District to receive federal grant funding. The SWI was temporarily derailed by "the four sisters"—plants in Middleburg Heights, Strongsville, Brookpark, and Berea. In addition, an east leg was never built because North Royalton, Strongsville, and Medina decided they could continue to operate their own plants in that area.

Despite the challenges, the environmental impact studies were approved and grant applications began by the fall of 1984. Since these two projects were the highest ranked under the State of Ohio's project priority system, and the District would receive the federal grant funding for several years, the District agreed to segment these projects and build them over a longer time period.

From the 1970s to the 1980s, the District constructed the Northwest and Cuyahoga Valley Interceptor programs. From the 1980s until 2000, it tackled the Southwest and Heights/Hilltop Interceptor programs. As of 2007, the District continues to put the finishing touches on its Mill Creek Watershed improvements.

By 1995, the District was done with initial plant reconstruction. And plant expansion and rehabilitation would not have taken that long if not for the need to transform Westerly into a biological wastewater treatment facility. (See "Westerly Wastewater Treatment Plant," page 38.)

Over the last decade, the District has taken on intercommunity relief sewers, which were not part of its original charge. (See "Interceptor and intercommunity relief sewers," page 48.)

Clean Water State Revolving Fund offers some relief

When the federal (U.S. EPA) grant program ended in 1990, the government replaced it with the Clean Water State Revolving Fund program. Under this program, the U.S. EPA provides grants to all 50 states plus Puerto Rico to capitalize state loan funds. The states, in turn, make loans to communities for high-priority water-quality projects. The program that processes these low-interest federal loans in Ohio is called the Water Pollution Control Loan Fund (WPCLF) and is administered by the Ohio EPA.

As the loans are repaid with interest, new loans are made to other recipients to help maintain water quality in their communities. The seed money for the fund is provided by federal capitalization grants and 20-percent state matches. When funded with a loan from this program, a project typically costs less than it would by borrowing through the bond market. Consequently, the District was quick to take advantage of this opportunity when the grant program ended.

The District applies for these loans by nominating specific projects and submitting them to the Ohio EPA. The Ohio EPA then prioritizes these projects along with other submissions from throughout the state, using a water quality based ranking system. The projects that rise to the top of this ranking system qualify to receive the loans.

Since 1991, the District has received a total of $646.4 million in low-interest loans. The very first loan was for the Hilltop Interceptor (Contract G) and was for $18.4 million. Until very recently, the District received approximately $40 million per year through the State Revolving Fund program.

However, this source of funding, though never approaching the savings of grant money, has recently become more limited. In 2007, the Ohio EPA established state-wide and per-community limits on how much money it would loan, because demands for loans across the state began to increase. As a result, any single entity can only borrow up to $25 million per year, whereas previously the amount that entities could borrow was unlimited.

1997

Competitiveness Initiatives, focused on cross-training and employee development, begin.

2001

A 12-hour operator shift replaces the 8-hour for a one-year trial run. Operators favor the switch by a 2-1 margin and the change is formally adopted in 2002.

2003

McMonagle Building opens to administrative employees.

District intranet launched.

2004

District launches its first Internet homepage.

2005

Department of Communications & Community Relations is created, emphasizing importance of outreach to public and employees.

2007

Board gives approval to promote stormwater management.

Erwin Odeal retires after 24 years as Director and Executive Director and 33 years with the District.

Julius Ciaccia becomes Executive Director, the fourth director in the District's 35-year history.

Other sources of funding

Special appropriation grants fund special projects that are specifically identified in the State and Tribal Assistance (STAG) account of the U.S. EPA appropriation bills. Congress identifies the recipient and amount of each grant. These special projects implement the planning, design, and construction of a variety of water and wastewater infrastructure projects.

The District received $90.6 million in special appropriations between 1995 and 2005. In 1995, General Counsel William B. Schatz was instrumental in working with U.S. Representative Louis Stokes to secure $60 million in special appropriations to convert Westerly from a failed physical-chemical plant to a new biological wastewater treatment plant.

From 1997-2005, the District received $30.6 million in special appropriation grants to cover the Doan Brook Watershed Study and pay for improvements in the Easterly/Doan Brook service area and at the Easterly Wastewater Treatment Plant.

Internal changes

During the 1980s the centralized management style that had been established in the 1970s continued while employees worked to fulfill the requirements of the court order. But significant change in the organization was spurred by the threat of privatization in 1996. A number of public agencies throughout the country had fallen victim to private companies promising to run them at lower cost, but the District was determined not to be one of them.

The first area of focus was the Operation & Maintenance Department, because District leaders felt that core business was most vulnerable. EMA, the consulting firm selected to perform a competitiveness assessment, was charged with giving an overview of the organization's fiscal health and providing a gap analysis that would identify ways in which wastewater treatment agencies could reduce their costs.

One troubling realization was that privatizers advocated barely meeting plant permit limits—instead of exceeding expectations, as the District had always aspired. That meant the concept of excellence would be supplanted by doing work that was "just good enough."

It turned out that the District did not need to compromise its standards. The Plant Competitiveness Initiative in 1997 paved the way to doing more with less, mainly by developing a smaller, better-trained, more-flexible workforce, and effectively using technology as a tool.

In negotiations with the unions pertaining to the initiative, the District promised that no employee would be laid off due to this reorganization. Fortunately, an ample number of long-timers allowed for staff reductions, simply by not replacing retiring employees. Still, that didn't prevent anxiety about job stability from spreading.

Another goal was cross-training plant operators to be able to perform any job throughout the plant. Instead of Operators A, B, C, and D, everyone was assigned one title: Wastewater Plant Operator, or WPO.

The change was a real benefit for a number of Operations employees who found that their wages would increase along with their job performance. But others who were already cross-trained and had been making more money were upset at no longer having a professional or monetary advantage. Those reactions, compounded by the massive training and education movement taking place, prompted many employees to retire. As a result, a plant like Southerly, with 246 employees, over time shrank to 154.

The next step after reducing staff at the plants was to apply some of those same principles to the support services and administrative levels. This second phase turned into the Support Services Competitiveness Initiative, with similar goals: do more with less and make better use of technology.

District leadership felt confident that the two initiatives would help prepare the organization for the challenges of the 21st century. Among the results was a reduction in overall staff to 569 employees in 2002 (from a high of 723 in 1990) and the installation of plant automation software that enabled computers to monitor and operate many processes.

Another important ingredient in positioning the District for the next century was relying on teams and empowering front-line employees to make business decisions on their own. In effect, the District's focus had shifted from what it needed to do in the 1970s, 1980s, and early 1990s, to refining how it conducted business in the mid-1990s forward.

The Competitiveness Initiatives of the 1990s increased the abilities of current employees, enabling the District to be more efficient with a smaller workforce.

FOLLOWING RATE INCREASES

SEWER RATE FEES were based on water consumption long before the District assumed ownership in 1972. The City of Cleveland began charging connected communities for sewage treatment in 1938 to help pay for improvements. Cleveland charged suburban customers higher rates by reasoning that the suburbs benefited most from the expanding sewer system.

Today's rate differential can be attributed to the court order that formed the District. It identified specific projects for which suburban customers had to pay and specific projects for which City of Cleveland customers had to pay. In addition, suburban customers had to pay $33 million to Cleveland for the wastewater treatment plants. Funding for most of these projects was over 20-25 years. Since these projects are now significantly paid down or off, the District implemented a 20-year rate equalization process in 2003. As a result, in 2022, there will be one sewer charge rate for all regular customers.

In simple terms, sewer charges fund operations, maintenance, equipment replacement costs, and capital improvements (pay-as-you-go and/or debt-service payments). The District's capital improvement program includes major projects such as interceptor construction and plant renovations.

Sewer rates are calculated by first identifying annual needs for operation and maintenance expenses, debt service payments, and pay-as-you-go capital, and dividing the total by the estimated total water consumption. The calculation has remained constant.

However, the rates themselves have changed significantly over the years. Since the end of federal funding in 1990, sewer rates have risen continuously.

In 1974, the average Cleveland resident paid $1.41 per thousand cubic feet (mcf) and the average suburban resident paid $3.79 per mcf. In 2007, those charges were $30.85 per mcf for Cleveland residents and $35.10 per mcf for suburban residents. This significant increase is the result of a lack of federal grant funding since 1990 and rising costs, primarily due to inflation.

According to Deputy Executive Director and former Director of Finance F. Michael Bucci, once the federally mandated unfunded Combined Sewer Overflow long-term plan is instituted, "we can anticipate double-digit rate increases for the foreseeable future."

Also playing a role in increasing rates is a declining customer base coupled with an expanding service area. Since 1972, the population the District serves has remained relatively consistent while the service area has nearly doubled. The District has also seen a significant decrease in its largest user group, industrial customers.

To help customers, the District offers two rate-saving programs: the Homestead Program (implemented in 1991) and Summer Sprinkling Program (implemented in 1993). The Homestead Program offers a significant discount to homeowners that are 65 and older, or under 65 and totally disabled. Customers must also meet a maximum household income requirement and own the property in which they live.

continued on next page

Teams were assembled and assigned specific tasks with charter agreements that both senior management and the commissioned team had to sign. This approach was successful to varying degrees. Some employees complained that they were excluded from teams for personal reasons, and some senior management members were not comfortable handing over decision-making authority. The organization was moving into uncharted territory.

The expectations of team members were high, but their suggestions were not often accepted or implemented to the extent they had hoped. Again, a number of senior employees left because they became too uncomfortable with the changes, while others reached retirement.

Time for a strategic plan

In 1998, the District decided it was necessary to produce its first Strategic Plan to clarify and refine its goals for the next five years and determine how the organization would use its resources to accomplish those goals. The motivation was to try to provide employees with a clear sense of direction and purpose that would help them make everyday choices about which opportunities to pursue. The result was a strategic plan for the years 1999 to 2003, declaring five primary goals:

1. Continue to maintain environmental compliance at all facilities.
2. Determine the District's future role in stormwater management.
3. Continue to operate in a fiscally sound manner for the benefit of its customers.
4. Fully develop and utilize human resources to maximize their potential.
5. Effectively use technology as a tool.

When management was ready to produce the next strategic plan for the years 2004 to 2008, it used a more participatory process. More focus was placed on input from employees at all levels, capitalizing on local expertise and collaborating with a Strategic Plan Development Team that consisted of three Senior Staff members and five staff members. The five goals for the second plan were to:

1. Maintain the District's excellent service record and reputation.
2. Improve the dynamic business culture.
3. Improve the use of people resources.
4. Determine future business.
5. Determine the most cost-effective and equitable means of funding the future.

These initiatives were relatively successful in accomplishing their intended goals, and, ironically, by the time the competitiveness goals were realized, the threat of privatization was not as ominous. Many privatization ventures from the late 1990s hadn't been as successful as anticipated.

The District's second official Strategic Plan was instrumental in determining future opportunities.

FOLLOWING RATE INCREASES *continued from page 21*

Under the Summer Sprinkling Program, customers' summer bills are based upon the lower of average winter water consumption, or actual summer water consumption. As a result, customers do not pay for seasonal use, such as watering their lawns.

There was actually one point in history that the District reduced rates. In the early 1980s, construction was temporarily halted because the District needed to complete environmental impact studies before it could receive additional federal grants. As a result, the District was unable to complete major construction projects because it did not have the money to pay for them. In response, District management and the Board decided to roll back rates. Board member John Petruska explained that "it was wrong to charge customers for projects we know we won't be able to start for the next couple of years." □

Proposing a 30-year combined sewer overflow long-term control plan

Part of the original court order addressed combined sewer overflows. Combined sewers, primarily built in the late 1800s and early 1900s, carry both sewage and stormwater. They are prevalent in older cities and inner ring suburbs. When heavy flows of stormwater enter the combined sewers, control devices may allow some of the flow—a combination of stormwater and sewage—to overflow into area waterways, preventing combined sewer and residential backups. This release, known as a combined sewer overflow (CSO), contains bacteria from human waste, industrial waste, and other pollutants swept from the ground's surface.

The interceptors that the District has constructed have helped decrease the incidence of CSOs, but the U.S. EPA mandated further standards in controlling remaining overflows in the Federal 1994 Combined Sewer Overflow Control Policy. Unfortunately, federal funds are not available to pay for this additional work, although it is federally mandated. That means ratepayers will have to pay the entire bill through increased sewer charges.

Based upon a Financial Capability Assessment, the District is proposing to do the necessary work, estimated to cost more than $2 billion over a 30-year period. The $2 billion is in addition to another estimated $2 billion necessary to maintain the current facilities and infrastructure. The District continues its negotiations with the Ohio and the U.S. EPA with the hope that a fair schedule can be achieved.

A combined sewer under East 107th Street. During heavy rains, a combination of rainwater and diluted untreated wastewater flows over the weir to an outfall.

Looking at future business

After completing almost all of the major tasks that were part of the original court order, the District took a hard look at the future. With the end of federal funding in 1990, and even with the State Revolving Fund program, there was a need to consider new revenue sources. There was also some unfinished business from the court order—a plan to address stormwater drainage—that the District needed to address. These needs prompted an initiative that came to be known as Future Business.

Because the original court order required preparing a plan for more effective stormwater drainage, stormwater management became a primary component of Future Business. Another reason for the District's interest in stormwater management was the anticipation of the Stormwater Phase II Final Rule, which would force all municipal separate storm sewer systems (MS4s) to implement programs and practices to control polluted stormwater runoff.

Concentrated effort began on the Regional Plan for Sewerage and Drainage (RPSD) in early 1998, prior to the release of the Phase II Regulations in December 1999. RPSD was a multi-year, multi-phase program to determine the future role the District should play in regional stormwater

The Regional Plan for Sewerage and Drainage included inspections of local streams to document problem areas, such as this 2004 example of bank erosion along Euclid Creek.

management. The RPSD determined the scope of the next step in the process, called the Regional Intercommunity Drainage Evaluation (RIDE).

The RIDE study focused on intercommunity stormwater issues and determined that many stormwater drainage problems were intercommunity issues that could not be solved by individual communities alone. As these events unfolded, it became even more apparent that the District was uniquely equipped to tackle stormwater management—especially given the regional scope of its business.

But assuming stormwater management is not without its challenges. The District recognized that in addition to the complexities of dealing with 61 communities and the U.S. and Ohio EPAs over storm sewer overflows, storm sewers, and streams, any District-led stormwater management program would have to face the sensitive issue of establishing a wet weather revenue source.

Despite the complexity of this issue, in June 2007, the District's Board of Trustees agreed that the District should take the necessary steps to establish a stormwater management program. Early efforts will include research to determine revenue sources and jurisdictional issues.

Succession planning and leadership sustainability become priorities

The first rumblings about succession planning occurred when the second strategic plan was developed. Gradually, management realized that more than 50 percent of District employees could retire within five years. The Board, recognizing this eventuality as well, requested that the District implement a formal succession plan. The result was the Leadership Sustainability Program.

The Leadership Sustainability Program consists of eight components, several of which the District is working on concurrently:

1. **Workforce Analysis** systematically reviews the current jobs in the District and provides a profile of current job needs.
2. **Leadership Development** identifies and develops current and potential leaders.
3. **Replacement and Recruitment** conducts job searches to fill anticipated needs.
4. **Workplace Re-Assessment** builds on the knowledge gained from the Workforce Analysis to align jobs and job tasks.
5. **Supply/Demand Analysis** determines when to recruit and become an "employer of choice" for potential candidates.
6. **Diversity and Inclusion** ensures a diverse and vital workforce.
7. **Managers as Developers** trains managers to develop people for increased responsibility.
8. **Knowledge Retention** provides a tool to harness knowledge of retiring organization leaders.

Although succession planning was often discussed during the 1990s, the official Leadership Sustainability Program did not kick off until 2005. Employee-driven, the program was developed to help the District meet its current and future needs for technical and management leadership throughout the organization. Perhaps most importantly, the program will build the District's capacity to maintain a self-sustaining leadership-development process.

The most visible component and the one that probably causes the greatest challenges (because of who is ultimately chosen to participate) is Leadership Development, which identifies and develops District employees as potential leaders for the future. Four levels outline the track that candidates will follow to advance to leadership positions, such as managers and directors. Although selected individuals may demonstrate managerial or technical aptitude, inclusion in the program does not guarantee advancement to any position.

At the time of this publication, Senior Executive Level, Executive Level, and Senior Management Level candidates have been selected and assigned development programs. In addition, the Manager Development level has been launched and the Professional/Technical Development track has been designed.

District employees participate as both students and teachers in the "Managers as Developers" component of the Leadership Sustainability Program.

THE EARLY DAYS OF THE INDUSTRIAL WASTE SECTION

ON JUNE 12, 1973, the new Cleveland Regional Sewer District (CRSD) contracted with the City of Cleveland's Water Quality Laboratory to establish a system that would charge industry within the borders of the CRSD a "fair and proportionate" sewer charge. This was a prerequisite of the Federal Water Pollution Control Act Amendments of 1972 for receiving federal construction grants.

Jim Weber, a chemist with the Water Quality Program, was given the lead to develop a program to comply with these requirements. With Jim Laheta (from the laboratory), he assembled a file system of companies within the District's jurisdiction. To determine CRSD's service area, the size and location of tributary sewers, and to begin sampling to assess the nature and strength of industrial waste discharge by industry, Weber also recruited Larry Adloff (also from the lab).

To obtain information about industries within the CRSD service area and to facilitate access to industrial sites, Weber developed a letter and questionnaire to distribute to all companies on the Water Department's large water account list.

The District held numerous meetings with the Greater Cleveland Growth Association, Association of Metal Finishers, plant operators, coin-op laundries, linen suppliers, and other trade groups in the area to get the word out on the upcoming User Charge Program. January 1974 was established as the date the new billing programs would be ready.

Weber developed an Industrial Waste User Charge formula based upon three factors: Flow, Biochemical Oxygen Demand, and Total Suspended Solids. Utilizing the research of Adloff and Laheta, he prepared a list of class average rates that would apply to specific industrial groups.

By December of 1973, all of the various pieces of the puzzle were coming together—but what was lacking was a clear definition of authority to enforce standards and some sort of surety to industry that things wouldn't change with every new administration. After several meetings, Weber and Lou Rego, the CRSD's General Counsel, agreed to develop a Sewer Use Code that would memorialize the program and ensure uniformity and consistency. This Code was adopted by the Board of Trustees in December and authorized the implementation of the User Charge Program in January 1974.

It was also in January 1974 that Weber, Laheta, and Adloff were transferred from the City of Cleveland to the Cleveland Regional Sewer District. Now, as employees of the District, Weber established a budget, named this group the Industrial Waste Section (IWS), and began the requisition process for vehicles, monitoring equipment, and staffing of this new District division. The IWS invested a lot of energy into fine-tuning the billing system to ensure fair and comprehensive charges.

This continued monitoring of industry revealed that there were some very dangerous, deleterious, and toxic discharges being dumped. High concentrations of strong mineral acids, cutting oils, lubricants, heavy metals, and cyanides were commonly found in the collection system. The IWS staff also observed that there was minimal control over septic tank waste brought into wastewater treatment plants. Weber drafted language to more tightly regulate the acceptance and billing structure for this waste.

In June 1975, after reviewing the User Charge Data submitted by the industrial waste section, the U.S. EPA approved the Sewer District's User Charge System, which now made the Sewer District eligible for hundreds of millions of dollars in grant money. This grant money was used to fund improvements at Westerly, Southerly, and Easterly, and to construct the Cuyahoga Valley and Northwest Interceptors. □

Information gathered through stream monitoring by IWS (now WQIS), shown in this 1988 photo, helps the District assess water quality.

Ground was broken for the George J. McMonagle Building in 2000. The building was completed in 2003.

Executive Director builds a legacy

In 2000, the District broke ground to construct a new administration building at a ceremony honoring 95-year-old Judge George J. McMonagle. Three years later, the organization moved its administrative headquarters from the worn building at 3826 Euclid Avenue to a modern facility next door at 3900 Euclid.

At a cost of $22 million, the new building was designed to accommodate a growing engineering department (which had been renting space in a separate building for several years) and increasing technological needs. Executive Director Odeal named the new District headquarters after Judge McMonagle, who died a year before the building was complete.

Nearing retirement, Odeal wanted to continue the District administration building's residency in Cleveland as a symbol of its commitment to the city. Although the District received some negative media coverage for the building's alleged grandiosity, civic leaders agreed that it was an attractive, though modest, addition to the midtown corridor.

Communicating the District's value: the need for Communications & Community Relations

Although the District employed a Public Information Officer (PIO) during its early years, the position's focus was primarily community involvement. The District invited the public to open houses at the plants and participated in environmental festivals such as Earth Day. Press releases to the media mostly announced the beginning and ending of major construction and the election of new Board officers.

Once the PIO left in 1997, a Communications Manager assumed some of the PIO's former responsibilities and the focus shifted to internal communications, publications, video projects, and the internet. Under the direction of an informal two-person Communications Group, the District continued to produce annual reports highlighting how the District's work had improved water quality and the quality of life in Northeast Ohio. These reports were well received and often recognized by professional peers. Nonetheless, it was clear that the majority of the public still really had no idea what the District did.

Expanding public and youth education efforts is a way of delivering the District's clean-water message.

Odeal felt that the solution to this problem could be realized through education. He believed elementary school-aged children were a fitting target because they take everything home to their parents. So the District cultivated relationships with local schools such as Clark Elementary on Cleveland's West Side and the Carl and Louis Stokes Central Academy at East 40th Street and Central Avenue. The District integrated science and math projects into their curricula and donated supplies and materials to students who needed them. Still, recognition and respect from the general public remained elusive.

After years of operating under the radar, Executive Director Odeal recognized the need to increase the District's visibility in the media. The galvanizing issue was the Board and Senior Staff's realization that if the public does not understand or appreciate the District's work, they probably will not want to pay for it.

As a result, in 2005, Odeal created a new Director's position and accompanying department: Communications & Community Relations (CCR). Unlike the Communications Group, CCR had a separate budget and a clear directive to develop a strategic program to better communicate the District's mission and value to the media and the public.

As this history piece goes to press, CCR has embarked on a community awareness campaign called "Where Does It Go?" to highlight the District's role in protecting greater Cleveland's fresh water resources. So far, this approach has proved successful because it deals squarely with our biggest challenge: Most people take wastewater treatment for granted. They expect the toilet to flush, and the only time they really think about it is when it doesn't.

The next chapter

Water quality in Northeast Ohio has vastly improved since the District's formation. Largely due to the District's investment of over $2 billion in plant rehabilitation and sewer construction, Lake Erie and the Cuyahoga River have prospered in ways that were unimaginable three and a half decades ago.

Clean water has spurred economic growth through lakefront development and waterfront real estate construction. And the proliferation of fish species and other wildlife that had virtually disappeared in the late 1960s has resulted in revenue generating fishing competitions and other water-related sporting events. Perhaps most importantly, civic leaders are beginning to recognize clean water's potential to fuel economies of the future, such as wind energy.

Many challenges remain, however. Due to the absence of federal funds since 1990, the District must rely on its customers to pay for the federally mandated long-term combined sewer control program—as well as increasing operation and maintenance costs. The combined price tag for these projects is $4 billion. Additional challenges include an aging infrastructure and a weak economy.

Decreasing access to low-interest loans further exacerbates the burden on District customers. Considering the public's financial predicament, the District must continue to lobby for federal financial assistance and operate as efficiently as possible.

The District is experiencing internal challenges as well. Although anticipated, there has been a rash of retirements over the past year, including those of General Counsel William B. Schatz, Executive Director Erwin J. Odeal, and Director of Engineering & Construction Charles Vasulka. All three men were 30-plus-year District employees. Succession planning has replenished some vacated positions, yet outside talent has filled a number of key positions. Julius Ciaccia, formerly Director of Public Utilities for the City of Cleveland, became the new Executive Director in November 2007. Soon thereafter, Marlene Sundheimer, who had also worked at the City of Cleveland, replaced Schatz as Director of Law. With this infusion of new leadership, a new culture has begun to emerge.

Still, the District's priorities have not changed. This organization maintains its commitment to developing a stormwater management program, creating other alternative revenue sources, and further solidifying its position as an environmental leader. Regardless of the political landscape or the economic challenges, the District's mission remains to protect public health and the environment, thereby assuring clean water for a greater Cleveland. □

SEWER DISTRICT BOARD MEMBERS

Richard R. Hollington 1972-73
Walter C. Kelley 1972-73
David B. Bailey 1972-75
Jackie Presser 1972-76
Raymond Kudukis 1972-78
Louis J. Bacci 1972-84
Mary J. Coleman 1972-84
Jack A. Hruby 1973-75
Nicholas DeVito 1973-79
Anthony Liberatore 1975-78
Gloria J. Battisti 1976-83
Louis V. Corsi 1978-79
David H. Kirschenbaum 1979-80
John Petrushka 1975-88
Charles R. Miller 1979-83
Jack M. Schulman 1979-84
Anthony C. Amato 1980-87
Edward J. Rawlings 1983-87
William J. Reidy 1983-1992
Lester C. Ehrhardt 1984-92
Edward H. Richard 1984-93
Ronald D. Sulik 1985-94, 2002-
Harry Alexander 1987-88
Rosemarie F. DeJohn 1987-97
Thomas J. Longo 1988-
E. Theophilus Caviness 1989-91
William H. Denihan 1991-94
Allan R. Mills 1992-97
Michael L. Nelson, Sr. 1992-2005
Brian E. Hall 1993-94
Sheila J. Kelly 1994-
Gary W. Starr 1994-
Michael G. Konicek 1994-2001
Andrew T. Ungar 1997-2002
Gerald M. Boldt 1997-2007
Darnell Brown 2001-
Anthony D. Liberatore, Jr. 2006-
Dean E. DePiero 2007-

Southerly, 1978

The History of the Plants: Easterly, Westerly, and Southerly

Upon its creation in 1972, the District assumed ownership of the Easterly, Westerly, and Southerly Wastewater Treatment Plants. But all three plants predated the District's formation by several decades. Thus, the individual plants' histories, at least until 1972, are quite independent from the District. This section follows these individual histories, which can be traced back to the 1920s and 1930s.

The plans and studies preceding the plants

by Terry Meister

As the City of Cleveland grew throughout the 1800s, the purity of the water supply became an increasing cause for concern. The State Department of Health began to call attention to the dangers of polluting the water supply in 1895. At this point, officials, scientists, engineers, and other interested parties began to seriously contemplate how to address the growing problem. The following plans and reports were the result. It is evident how these early concepts shaped Greater Cleveland's current wastewater treatment system, with the Pratt Plan becoming the most influential.

THE HERING-BENZENBERG-FITZGERALD PLAN

A study on water and sewage control conducted in Cleveland in 1896 led to a report by the Commission of Engineers on water supply and sewage disposal issues in the City of Cleveland. This report was known as the Hering-Benzenberg-Fitzgerald Plan, named after the members of this commission. It made four recommendations:

1. That a combined system of sewers be provided for the main portion of the City, with a separate system of sewers for the low-level section along the Cuyahoga River.
2. That permanent points for intake of the drinking water supply and the discharge of sewage be established, and that these should not be less than ten miles apart.
3. That a system of "intercepting sewers" be constructed, collecting the sewage of the entire city and carrying it to a discharge point in Lake Erie, ten miles east of the water intake and extending not less than one-half mile into the lake.
4. That the sewage be screened on the shore and carried out into the lake by submerged pipes as near the lake bottom as practicable.

As a result of this study, the Easterly Interceptor was constructed and placed in operation in 1905, running from the Cuyahoga River along the lakefront to the current site of the Easterly Wastewater Treatment Plant at East 140th Street and Lakeshore Boulevard. The Easterly Interceptor took sewage flows from the combined trunk sewers along its route and carried them into Lake Erie, but no treatment of any kind was included in the plan. By 1908, coarse bar screens were installed at the terminal basin of the interceptor, and a 63-inch steel outfall pipe was extended 2,000 feet into the lake. Engineers originally intended to install siphons under the Cuyahoga River to carry sewage from the west side of the City into the Easterly Interceptor as well, but these siphons were never constructed. (It was the first time this concept would be suggested, but not the last.)

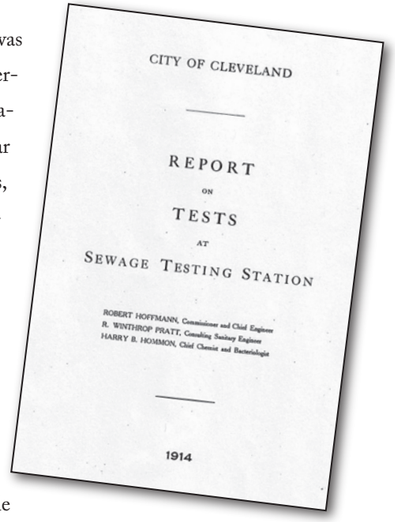
It is important to note that the original plan recommended "combined sewers" for the main portion of the City. A combined sewer carries domestic sewage, industrial sewage, and stormwater all in a common sewer, as opposed to a "separate sewer" system that isolates stormwater from the domestic and industrial sewage flows.

THE PRATT PLAN OF SEWERAGE

In 1911, R. Winthrop Pratt, Consulting Sanitary Engineer for the City of Cleveland, was commissioned to undertake a study to form recommendations for treatment of both drinking water supply and sewage. This was before the construction of the City's water purification plants. Pratt concluded that "sewage works" (treatment plants) would not prevent possible pollution of the water supply from surface drainage entering the Cuyahoga River within city limits, or from the "diluted sewage which must pass into the lake once or twice a month through some 30 stormwater overflows in the sewer system." Pratt also concluded that if drinking water purification works were constructed, the main objective of sewage treatment would be to protect the beaches, shores, and lake waters with an eye on preventing bacterial pollution of the lake at the water intakes. Pratt recommended additional studies to further define a course of action.

As a result of Pratt's recommendations, the Cleveland Sewage Testing Station was constructed at the present site of Easterly WWTP, at the terminus of the Easterly Interceptor. Testing at this site for 11 months (beginning in January 1913) entailed investigation of various forms of "sewage treatment," including grit chambers, hand-cleaned bar gratings and coarse screens, sedimentation in various types of tanks, roughing filters, trickling filters, and sludge treatment. Based on these tests and related engineering studies, Pratt formulated the following conclusions in his "Report on Tests at Sewage Testing Station" (1914):

1. The Cleveland areas should be divided into four major sewerage districts—the Westerly, Easterly, Southerly, and Low Level districts—and each of the first three should be provided with a main intercepting sewer to deliver sewage to a local sewage treatment site.
2. The sewage from the Westerly and Easterly districts should be treated at two lakefront works (at West 58th Street and East 140th Street), while the sewage from the rest of the City should be treated at a site on the Cuyahoga River opposite Willow Station (now Cuyahoga Heights).
3. Partial treatment of the sewage should be provided at the Westerly and Easterly sites, and complete treatment should be provided at the Southerly site.


CITY OF CLEVELAND

REPORT
ON
TESTS
AT
SEWAGE TESTING STATION

ROBERT HOFFMANN, Commissioner and Chief Engineer
R. WINTHROP PRATT, Consulting Sanitary Engineer
HARRY B. HOMMON, Chief Chemist and Bacteriologist

1914

Pratt's "Report on Tests at Sewage Testing Station," 1914

Pratt indicated that 50 percent of the City's sewage would be treated at the "Easterly Works." He felt that clarification of the sewage, along with disinfection and discharge to the lake, would provide a sufficient degree of purification for this location. Pratt recommended grit chambers, scum removal, clarification in two-story tanks, disinfection by chlorine, and discharge at least one-half mile into the lake. He also suggested drying the sludge in enclosed structures and disposing of the dried cake as fill material or fertilizer. The proposed location of the Easterly works would make it the one facility immediately adjacent to a City neighborhood. In light of this, Pratt pointed out, "It is desired to particularly emphasize the importance of reducing to a minimum, both in the design and operation of this plant, all sources of nuisances or features which, from an aesthetic standpoint, will be objectionable for a plant located as this."

"The gross nuisance existing in the Cuyahoga River, caused by fifty sewers discharging into it, in addition to a large quantity of manufacturing waste, has been a source of complaint for many years. . . .

Pratt projected that 22 percent of the City's sewage would be treated at the "Southerly Works." Because it would discharge into the Cuyahoga River, he felt that a greater degree of treatment would be necessary at that site than at the Easterly or Westerly sites. With scientists determining that the flow of the river would be insufficient to oxidize a large quantity of treated sewage, Pratt recommended adding an oxidation step to the plant effluent, in addition to employing similar processes to those suggested for Easterly.

The remaining 28 percent of the City's sewage would be treated at the "Westerly Works." Then, as now, the limited space at the Westerly site was a concern, but Pratt felt that the smaller size of the Westerly service area would convey a fresher sewage to the plant than at the other two sites. As a result, he recommended that further testing be performed at Westerly to determine the preferred treatment process. The basic processes of grit and scum removal, disinfection, discharge, and sludge disposal were similar to those recommended for the Easterly site, but testing would be needed to determine whether to incorporate a clarification process similar to that proposed for Easterly, or to use fine screens (with the screenings disposed of by incineration or by using them as fertilizer).

Because Pratt felt that the fine screen process would be an economical and effective treatment process for this site, the City constructed a demonstration plant at the West 58th Street site to conduct fine screen tests for one year under Pratt's direction. Pratt's assistant engineer during the Easterly and Westerly studies was George B. Gascoigne.

Unfortunately, the City was unable to proceed with construction of these facilities due to the onset of World War I. In addition, lack of funds had limited what they were able to accomplish with the original testing station. As a result, additional tests were performed in 1916 and 1917 at the Easterly site, this time to demonstrate the applicability of the newly developed "activated sludge" process. A one million gallon per day ("1 mgd") pilot plant was built for this purpose. The results obtained from this work were very favorable and much original and valuable information was gained from these early studies.

In 1917, there was considerable controversy about the degree of treatment required at the two lakefront sites—particularly the treatment processes. After considerable discussion with a number of eminent sanitary engineers and health department officials, the conclusion was that the sedimentation (clarification) process would provide 35 percent purification, while fine screening would only be capable of 5 to 10 percent purification. As a result, it was determined that sedimentation—supplemented by disinfection during the bathing season—would be recommended for Westerly and Easterly.

Considerable concern was also expressed about the relationship between sewage treatment and the water supply. However, by this time, scientists had determined that it was necessary to treat raw lake water for drinking water purposes. Consequently, a modern water filtration plant was constructed in 1914 at the Division Avenue site (now Garrett Morgan Water Plant), along with a water intake extending five miles from shore.

In 1922, a sewage treatment facility consisting of bar grates, grit chambers, sedimentation tanks of the Imhoff type (two-level tanks with sludge digestion in the lower portion), and disinfection was placed in operation at the Westerly site. Preparatory devices consisting of bar grates, grit chambers, flow measurement, and disinfection were also built at the Easterly site, with the expectation of providing further treatment at a later date.

GASCOIGNE REPORT OF 1924

In 1924, George Gascoigne was commissioned to prepare a report on sewage treatment alternatives for the Southerly site. This report reconfirmed Pratt's recommendation that complete treatment was necessary because Southerly would discharge into the Cuyahoga River. Gascoigne recommended the construction of Imhoff tanks for primary settling and sludge digestion, and trickling filters for removal of dissolved organics. The relatively new activated sludge process was considered, but for economic reasons—and because of its unproved dependability—Gascoigne did not recommend this process. The Imhoff tank-trickling filter plant was constructed and put in operation in 1928.

ELLMS REPORT

In 1929, J. W. Ellms, Engineer of Water Purification and Sewage Disposal (later to become the City's first Commissioner of Sewage Disposal), submitted a report on treatment alternatives for the Easterly site. He recommended the incorporation of complete treatment at Easterly—construction of an activated sludge plant with primary settling—and sludge digestion "at some location other than East 140th Street." Ellms projected the cost of such a facility at $14 million.

HOFFMAN-HOWSON-HERRON REPORT

In May of 1930, a Special Engineering Commission was formed to report on the Cleveland water supply system. Driven by plans for the construction of the Nottingham Water Plant on the east side and a new water intake to be located four miles from the Easterly plant's discharge, the study recommended that sewage treatment at the Easterly site "be undertaken at as early a date and to as high a degree of completeness as financial limits will permit." (Ironically, due to financing disagreements between the City and the suburbs, the Nottingham plant would not be constructed until 1951.)

GASCOIGNE REPORT OF 1931

In November of 1930, a referendum was held in the City of Cleveland to vote on approval of the sale of bonds to fund construction of sewage treatment improvements. The response of the public was favorable. As a result, George Gascoigne revisited the report written by J. W. Ellms two years earlier, with the same conclusions. Gascoigne recommended that an activated sludge plant be constructed at the Easterly site, with treatment of the solids to take place at some other site, preferably at the Southerly Sewage Treatment Works.

It is interesting to note the change in preference for the level of treatment from a decade-and-a-half earlier. This may have been motivated by the growing need for new water intakes, increased use of the lake for boating and swimming, significant advances in the art of sewage treatment, and the general public demand for improvement in the level of treatment.

The activated sludge plant constructed at the Easterly site went into operation in 1938. The design included facilities to pump sludge 13 miles under the City of Cleveland to the Southerly site for disposal and incorporated sludge digestion and incineration in the Southerly plant. At the same time, similar sludge digestion and incineration facilities were provided at the Westerly plant, and an "abbreviated" activated sludge plant was constructed at the Southerly site.

In fact there are few if any streams in this country which are more foully contaminated. . . . It is imperative to cease the discharging of untreated sewage into the Cuyahoga River and harbor."

—1914 REPORT ON TESTS AT SEWAGE TESTING STATION

Easterly Wastewater Treatment Plant

by Raymond Weeden and Andrea Remias

The Easterly Wastewater Treatment Plant began as a screening-only treatment point for raw wastewater collected in Cleveland and discharged into Lake Erie. Planning for the plant began in 1896 with the development of the Hering-Benzenberg-Fitzgerald Plan, which recommended building a system of combined and separate sewers to collect wastewater and transfer it to interceptors for discharge into the lake. In 1905, the system of sewers and interceptors began operation. The Easterly Interceptor extends from the Cuyahoga River to the current location of the Easterly Wastewater Treatment Plant at East 140th Street and Lakeshore Boulevard. Engineers also recommended screening the wastewater, so a screening facility was built and put into service in 1908, along with a 63-inch outfall pipe extending 2000 feet into Lake Erie.

As a result of the 1911 Pratt Plan of Sewerage, the Cleveland Sewage Testing Station was built in 1913. The testing station was to be used for an 18-month study and consisted of a grit chamber, hand-cleaned bar gratings and coarse screens, a variety of sedimentation tanks, roughing filters, trickling filters, and sludge treatment. Influent flow was routed through the testing facilities prior to discharge into the lake. Pratt's conclusions from the study were to install permanent grit chambers, scum removal, clarification in two-story tanks, and disinfection by chlorine, and to discharge effluent at least one-half mile into the lake. He also suggested drying sludge in enclosed structures and disposal of dried cake as fill or fertilizer. These facilities were never constructed due to the onset of World War I.

Availability of equipment at the Easterly site led to additional tests beginning in 1916 to demonstrate the applicability of a newly developed "activated sludge" treatment process. The City constructed a one-mgd activated sludge pilot plant for this purpose. Results were favorable, and useful data were collected.

The design and construction of full-sized preparatory works with chlorination facilities and a second submerged outfall began in 1919 and was completed in 1922. These facilities included hand-cleaned bar screens, grit channels, a chlorine feeding and storage installation, and an 84-inch concrete submerged outfall extending about 2700 feet into the lake. City officials anticipated that secondary treatment would be provided at a later date.

Because the new Nottingham water plant intake was planned for installation about four miles from the Easterly outfall, three separate studies recommended the construction of a highly effective treatment works at the Easterly site as quickly as possible. The most comprehensive study in 1931 called for an activated sludge process with pre-settlement of the sewage and transfer of the waste solids to the Southerly Wastewater Treatment Center for processing and disposal. Based on these recommendations, the 123-mgd Easterly activated sludge treatment plant was constructed and placed in service in 1938. Its peak capacity was 307 mgd through primary treatment and 184 mgd through secondary treatment.

In 1959, City officials recognized that the size of the plant needed to increase when average flows exceeded the design capacity of 123 mgd for several months. "A Plan for Improvements and Enlargement of the Easterly Wastewater Treatment Plant," submitted in 1966, outlined improvements to address the significant additional flow and pollutant loading since 1938 by increasing

Easterly construction, 1932.

Easterly construction, 1937

EASTERLY TIMELINE

1905

Easterly Interceptor construction (Cuyahoga River at West 9th to East 140th and Lakeshore) completed.

1908

Easterly begins screening wastewater.

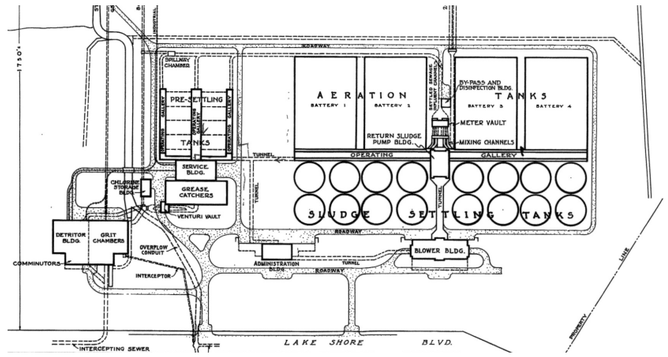
63-inch outfall pipe extended 2000 feet into Lake Erie.

1913

Cleveland Sewage Testing Station built for an 18-month study.

the average design capacity to 155 mgd. As a result of this plan, in 1968, the primary treatment capacity was expanded by adding four primary settling tanks, new primary sludge pumping and new grease separation facilities.

In 1974, the Facilities Plan for Phase I Improvements was submitted. This plan included a multi-phased approach for improvements driven by National Pollutant Discharge Elimination System (NPDES) permit effluent standards. Phase I was intended to address secondary treatment, including new disinfection and a new effluent pumping station. Phase II (1976) centered around a treatment process demonstration program for evaluating phosphorus removal, effluent filtration, and disinfection processes. The report recommended improvements to the return-activated sludge system and final settling tanks. A 330 mgd secondary capacity value appears to have originated within this 1976 report. It is based upon 310 mgd flow entering the plant and a 20 mgd allowance for filter backwash.



Easterly plant site drawing

Substantial expansion of the headworks facility and construction of a fluidized bed grease incinerator had occurred by 1976.

By 1981, construction of a new disinfection facility and effluent screw pump facility brought secondary capacity to 330 mgd.

In 1994, the District undertook the construction of the Heights/Hilltop Interceptor for transporting wastewater from the eastern suburbs to the Easterly Wastewater Treatment Plant. The plant headworks were modified to provide priority treatment to the separately sewered Heights/Hilltop flow. Also constructed in 1994 were three one-million-gallon sludge storage tanks, a pumping facility, and a new sludge force main (replacing the one originally installed in 1938) to the Southerly WWTC.

In 1997, the Easterly Wet Weather Preliminary Engineering Study evaluated ways to cost-effectively upgrade the Easterly plant to minimize untreated discharges of wet-weather flows. These improvements were implemented in 2002 during the Easterly Wet Weather Improvements project. The improvements consisted of replacing the coarse screens with 3/4" screens, leveling the detritus tank weirs, and installing a new primary effluent wet weather pump station to discharge flows from primary treatment in excess of secondary capacity. During this project, the Collinwood pump station also was upgraded. Five new pumps were installed and other improvements to the wet wells were made. The Collinwood pump station collects and pumps flows from the Collinwood Interceptor, which collects flows from the area south of Lakeshore Boulevard and east of East 140th Street, up into the detritus tank influent channel.

As of 2007, the District is completing the Easterly Wastewater Treatment Plant Comprehensive Facilities Plan Project. Its purpose is to:

1. Develop a 30-year capital improvement program and establish a plan for the plant's future wet weather flow management.
2. Establish the priority and schedule for renewal and replacement of aging infrastructure and equipment.
3. Establish a plan of capital improvements based on future conditions and regulatory requirements.

Various models and evaluations determined that the process capacity of Easterly's secondary process is significantly less than the assumed 330 mgd. Draft recommendations from the 2008 Comprehensive Facilities Plan include major improvements to provide reliable and sustainable secondary treatment capacity up to 300 mgd. "Sustainable" secondary treatment is defined here as up to 50 hours of secondary biological treatment capability without compromising NPDES limits. This 50-hour treatment ability is required prior to the implementation of the Easterly CSO Long-Term Control Plan.

1919

Design and construction of Easterly WWTP (including preliminary treatment and effluent chlorination) begins.

New outfall running 2700 feet into Lake Erie.

1922

Easterly construction completed.

1938

Secondary treatment plant completed and placed into service. Easterly becomes Cleveland's first activated sludge plant.

1966

Average daily flow of 123 mgd attained.

1972

District assumes operation of Easterly and continues to expand capacity and refurbish the plant to meet stricter discharge limitations.

1990s

Continued additional equipment improvements, representing a total investment of over $60 million through 1993.

A complete modernization of Easterly's biosolids pumping facility is finished. This includes a new 13-mile force main to transport solids to Southerly.

Westerly Wastewater Treatment Plant

by Terry Meister

Construction of the City of Cleveland's sewage treatment facilities began at the Westerly Sewage Treatment Plant at West 58th Street and Bulkley Boulevard in 1919. Westerly was placed in operation in 1922. The 36 mgd plant was designed to serve 288,000 persons and consisted of bar screens, grit chambers, Imhoff tanks (two-level tanks providing primary settling and sludge digestion), and chlorine disinfection during bathing season. At this time, digested sludge was disposed of by pumping through the outfall into Lake Erie.

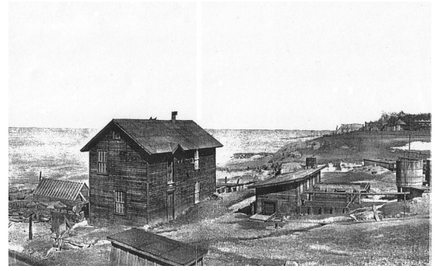
In 1932, the plant was upgraded by adding a detriter (grit-removal tank) for better grit removal, an aerated grease separation tank, two 50-foot diameter anaerobic sludge digesters, a sludge filter for dewatering, and a high temperature garbage incinerator.

In 1937, the plant added a new incineration building containing four vacuum filters for dewatering sludge and two multiple-hearth sludge incinerators. Four additional digesters, a digester gas storage ball, and pre-chlorination facilities were also added. By this time, total investment in the Westerly plant had reached $2,750,000.

In 1956, the Westerly plant upgrades included replacing the old grit chambers, detriter, and grease separation tank with two new detriters, new pre-aeration facilities, and three new mechanically-cleaned bar screens.

In 1966, a study was conducted to determine treatment alternatives for the Westerly plant. At that time, Westerly was the only City plant to be limited to primary treatment: Easterly and Southerly were providing secondary treatment through the activated sludge process. Westerly was constrained by the high industrial component in its influent, and was restricted by the small amount of space available at the plant site (eight acres). One of the alternatives considered was to construct an activated sludge plant on the Westerly site. To provide sufficient space for such a facility, construction of an "Island in the Lake" with roughly twice the acreage of the existing plant was proposed just outside the existing breakwater. The existing screening and grit removal facilities would remain at the old Westerly site, as would the digesters and incinerators. The Imhoff tanks (constructed in 1919) would be converted to a stormwater detention basin. After screenings and grit removal, plant flows would be pumped to the island for activated sludge treatment. Primary settling tanks, aeration tanks, secondary settling tanks, and a new chlorine contact tank would be constructed on the island.

Another option considered in the 1966 study harkened back to the original 1896 sewerage plan. Under this option, the Westerly plant would be abandoned and a lift station would be constructed at the existing plant site, with a capacity of 80 mgd. A 54-inch diameter cast-iron force main would be constructed to carry the sewage through a tunnel under the Cuyahoga River to the west end of the Easterly Interceptor, at the intersection of Lakeside Avenue and West 9th Street. The Easterly Interceptor had originally been designed to handle flows from the Westerly plant, so now all of Westerly's flow would be conveyed to the Easterly plant for treatment. However, this solution would have necessitated not only expanding Easterly, but also building additional capacity at Southerly, which would then handle sludge from all three of the City's plants. Neither the "Island in the Lake" nor the force-main idea was adopted.



Westerly, 1914.

Westerly, 1940

WESTERLY TIMELINE

1919

Construction of sewage treatment facilities begins at Edgewater Park on Lake Erie.

1922

Westerly expands to begin operating as a 36-mgd primary treatment facility.

1932

Westerly adds a detriter, aerated grease separation, anaerobic sludge digesters, a sludge filter, and a garbage incinerator.

The Westerly lab at West 58th, 1940

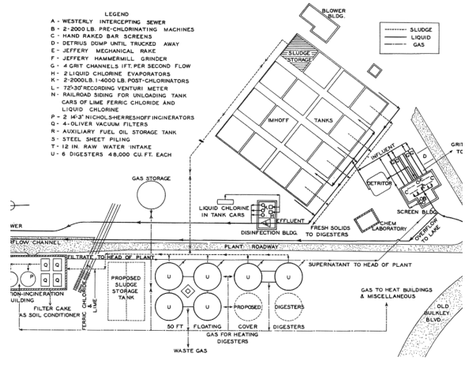
In 1970, the City of Cleveland began to explore additional alternative treatment methods for the Westerly plant. As a result of the various limiting factors facing the plant (high industrial load and limited space), the effectiveness of physical chemical treatment processes was investigated, with consultants being brought in to operate a pilot plant testing these processes at the Westerly site in 1970 and 1971.

Upon its formation in 1972, the Cleveland Regional Sewer District took over operation and design of the proposed Westerly Physical-Chemical Advanced Treatment Facility. Additional land was acquired, increasing Westerly's footprint to 14 acres. The District's Research & Development Group conducted a new series of pilot plant tests to further define the applicability of the new processes. The physical chemical process was an alternative to conventional secondary treatment which could be fit into a smaller space. The concept was approved and ground was broken in May 1974 for the construction of the new facility. The District began upgrading Westerly with the construction of new sludge handling and chemical handling facilities. This was followed by a continuing program of phased construction to rebuild the plant.

Following conventional screening and grit removal, the new Westerly resembled a water filtration plant more than a wastewater facility. Lime and polymer were added to flash mix tanks prior to the flocculator-clarifiers to enhance removal of suspended solids and phosphorus. The process elevated the plant pH to 10.5, necessitating treatment with carbon dioxide after the settling process to return the pH to a normal level of 7.0. The clarified effluent was then pumped through multi-media pressure filters to further reduce suspended solids and through activated carbon beds to reduce dissolved organics (BOD) in the final effluent. Oxygen from a cryogenic air separation plant and ozone from on-site generators were both used to augment the pressure filtration/carbon adsorption units. Chlorine was added for disinfection as a final step in the wet stream process prior to discharge into Lake Erie through the original outfall. On the solids side, horizontal bowl centrifuges were used for sludge dewatering, followed by feeding the sludge cake to one of two newly constructed multiple-hearth sludge incinerators.

At this point, Westerly's design flow capacity was 50 mgd with a 100 mgd wet-weather peak flow capacity. In addition to the plant proper, the Westerly site housed the Combined Sewer Overflow Treatment Facility (CSOTF), taking flows in excess of the plant's peak capacity. The CSOTF tanks were built on the original foundations of the old (1919) Imhoff tanks. By this time, these foundations were the only part of the original plant remaining. Flows up to 300 mgd going to CSOTF received primary settling, with flows up to 900 mgd receiving coarse screening. The maximum flow capacity of CSOTF was 1800 mgd. In addition, CSOTF was capable of retaining up to six million gallons during wet weather operation and pumping it back to the main plant for full treatment when flows returned to normal.

Construction of CSOTF was completed in 1983, and construction of the physical-chemical process in 1984. The District spent $123 million on the construction of the largest physical-chemical plant in the world at the Westerly site. In the years that followed, Westerly's operation was modified somewhat from the original scheme. Lime was replaced with ferric chloride for suspended solids and phosphorus removal, eliminating the need for carbon dioxide and reducing operating costs by $1 million a year. Ultimately, mechanical failures in the carbon adsorption system resulted in another major redesign of the Westerly plant.



Westerly plant site drawing, 1954

Upon the failure of the carbon columns, the District began to explore redesigning Westerly as a biological treatment plant. With the assistance of consultants Brown and Caldwell, a trickling-filter/solids-contact treatment process was selected for Westerly. In 1993, the plant began its conversion to biological treatment. The $60 million U.S. Representative Louis Stokes special appropriations grant, secured in part by General Counsel William B. Schatz, helped finance this redesign.

In December 1995, the new biological treatment process at Westerly was placed in operation, consisting of three trickling filters, three solids contact tanks, and three final settling tanks.

In 2001, the Westerly Headworks was expanded to include two additional plug valves, two additional bar screens and influent channels, Parshall flumes for flow measurement, two additional grit tanks, and an additional grit washer.

In March 2005, the new Westerly outfall conduit was placed in service, replacing the original outfall after 80 years of service. The new outfall conduit extends 4,750 feet into Lake Erie, which is 1,500 feet farther than the old conduit.

1937

Sludge incineration added to Westerly, as are additional digesters and vacuum filters and a "Hortonsphere" digester gas storage ball.

1956

Westerly adds pre-aeration tanks and some equipment upgrades.

1974

Ground is broken for the new Westerly facility, designed to be the "largest physical-chemical treatment center in the world."

1984

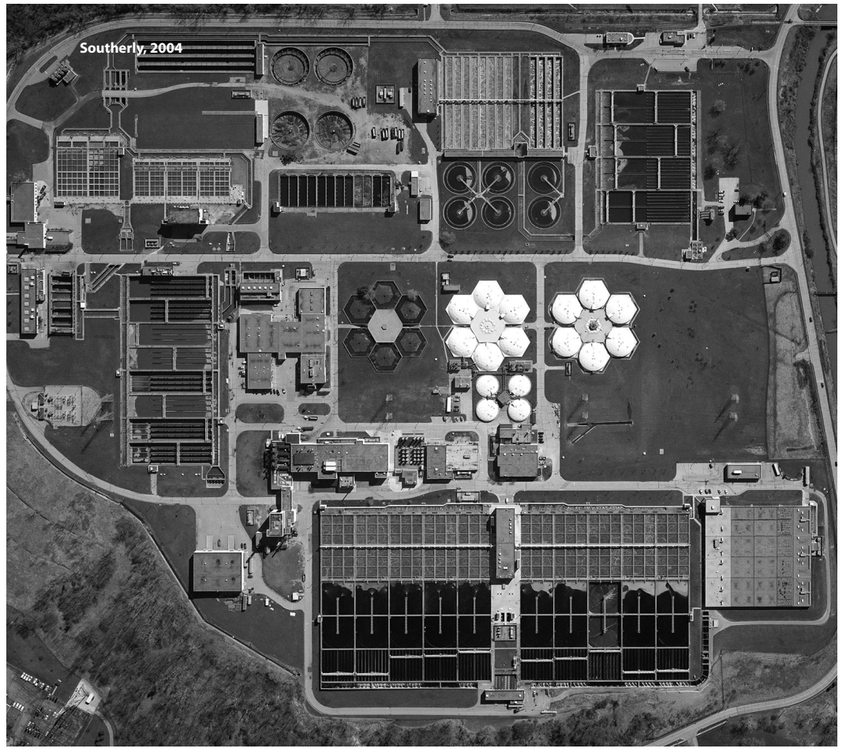
Major construction of the physical-chemical process completed.

1993

Conversion of Westerly plant from chemical treatment process to biological begins.

1995

District puts Westerly's new biological process online.



Southerly Wastewater Treatment Center

by Robert Mantell

In December 1914, after the sewage testing station had been operating for two years, R. Winthrop Pratt and George B. Gascoigne made the following observations for the Southerly site:

1. Approximately 22 percent of the city's sewage would be treated at these works.
2. It would be necessary that the effluent from the plant (which would be discharged into the Cuyahoga River) be relatively clean since the flow of the river would not always be sufficient to oxidize a large quantity of tank-treated sewage.
3. Consequently, a higher degree of purification was necessary than at the Easterly and Westerly works.

It was therefore recommended that the plant provide grit removal, grease and oil removal, sewage clarification by tank treatment, tank effluent oxidation in course grain filters, sludge drying, and final dried sludge disposal.

In 1924, Gascoigne submitted a report to the City on "The Treatment of Sewage from the Southerly and Southwesterly Sewerage Districts." The report reaffirmed the conclusions of R.Winthrop Pratt about the need for complete treatment of sewage discharged into the Cuyahoga River and recommended constructing an Imhoff tank trickling filter plant at the Southerly site. The plant, designed to serve 280,000 persons and treat an average dry weather flow of 35 mgd, was built between 1925 and 1927. It began operation in 1928. The then relatively new activated sludge process was considered but, for economic reasons and because of unproved dependability, was not recommended.

In 1931, Gascoigne's recommendations would again influence the Southerly site. In a report to the City called "The Treatment of Sewage from the Easterly Sewerage District" he recommended "that the treatment of the recovered solids take place at some other site, and preferably at the existing Southerly Sewage Treatment Works of the city." This decision led to the construction of the following facilities at the Southerly site from 1933 to 1938: a sludge force main from the Easterly site to the Southerly site, sludge concentration tanks, sludge digestion tanks, sludge vacuum filters, sludge incinerators, abbreviated aeration tanks, and clarifiers. Modifications to the trickling filters and humus tanks were also made. It was estimated that the plant would serve 410,000 persons and have the ability to treat an average dry weather flow of 45 mgd.

From 1950 to 1953, additional screening and detriter tanks, primary settling tanks, additional aeration tanks and clarifiers, additional digestion tanks, and a second outfall conduit were built. At this point, engineers estimated that the plant would serve 455,000 persons and have the ability to treat an average dry weather flow of 68 mgd.

From 1966 to 1968, the Imhoff tanks were converted to secondary digestion tanks. Also, several primary settling tanks were added along with aeration tanks and clarifiers, new sludge vacuum filters, new sludge incinerators, and elutriation tanks. It was estimated that the plant would serve 500,000 persons and have the ability to treat an average dry weather flow of 96 mgd.

In 1972, a design report authorized by the City for upgrading and expanding the Southerly site was completed and a basis of design was issued in February 1973. Later that year, the District assumed responsibility for the project.

The massive upgrade was completed between 1975 and 1987. The Southerly works were totally redesigned with the following new processes: mechanical bar screens and aerated grit tanks, additional primary settling tanks, a second stage lift station, a second stage aeration system, multimedia effluent filters and chlorine contact tanks, a chlorine distribution facility, a chemical distribution facility for phosphorus removal, facilities for primary sludge degritting and gravity thickening tanks, sludge storage tanks, a wet air oxidation

Southerly construction, 1985

SOUTHERLY TIMELINE

1924

Design of Southerly WWTC in Cuyahoga Heights (then Willow Station) begins.

Gascoigne Report confirms need for full treatment at Southerly site.

1928

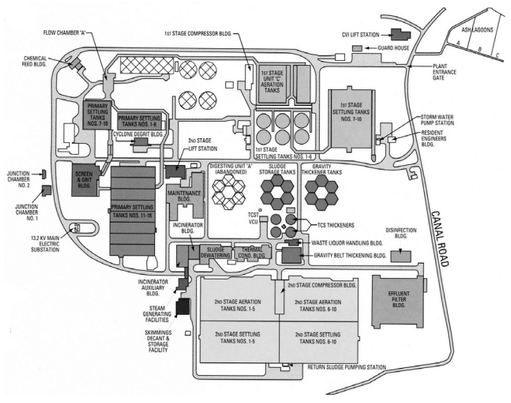
Southerly WWTC begins operation.

1930

Addition of Imhoff Tanks and trickling filters.

process, steam generation facilities, and skimming disposal facilities. Additional upgrades on existing primary settling tanks, aeration tanks and clarifiers, vacuum filters, and incineration were also done at this time. Engineers estimated that the plant would serve 605,000 persons and have the ability to treat an average dry weather flow of 175 mgd.

In the summer of 1987, the District entered into an agreement with the City of Cleveland to receive and treat water plant sludge from three of its water filtration plants. The sludge, pumped through force mains to interceptors, flows to the District's treatment plants. The Baldwin and Nottingham Water Filtration Plants convey their sludge to the Easterly site while the Garret Morgan Filtration Plant sludge travels to the Southerly site.



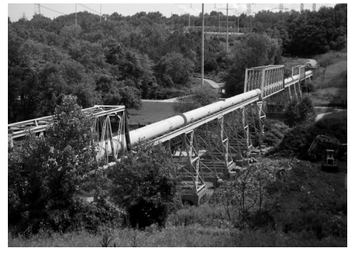
Southerly plant site drawing

No major process changes have occurred since these upgrades. However, over the last 20 years there have been numerous occasions when the District replaced aging equipment with current technology. Some major equipment additions or replacements have included new transformers, additional pumps, and a second force main to increase the capacity of the Cuyahoga Valley Lift Station. Gravity belt thickeners for thickening excess activated sludge replaced disc-nozzle centrifuges; vapor combustion units for odor control at three locations replaced chemical scrubber systems; a second package boiler was added at steam generation; high-speed centrifuges replaced vacuum filters at the sludge dewatering building; and new emergency generators increased back-up power capability.

In 1991, plant personnel successfully tested sodium hypochlorite for disinfecting plant effluent. In 1992, the District constructed a new disinfection facility that allowed them to discontinue the use of liquid chlorine—a change made with plant and community safety in mind. (Although sodium hypochlorite contains chlorine, it presents significantly less danger than liquid chlorine.) The facility included provisions for the storage and application of sodium bisulfite for effluent dechlorination to meet the new stringent National Pollutant Discharge Elimination System (NPDES) permit limit.

Between 1999-2003, the District installed a fiber-optic data highway, a closed-circuit television system, a process monitoring system, and a central monitoring station to allow real-time monitoring of plant process and pump station operations from area control stations. (The fiber-optic data highway was installed at the Easterly and Westerly plants as well.)

Numerous City of Cleveland and District initiatives have affected the Southerly site throughout its history. In 1928, the Southerly Interceptor (built between 1914 and 1933) was the sole conveyor of sewage to the Southerly facility. Since that time, five interceptors—the Mill Creek (1895 to 1932), Big Creek (1926 to 1939), Cuyahoga Valley (1977 to 1985), Southwest (1985 to 1996), and the new Mill Creek storage/conveyance tunnel (1997 to 2008)—have been added. The Mill Creek Tunnel provides for storage of up to 75 million gallons of sewage during storm events to eliminate or minimize combined sewer overflows in its drainage shed. In addition, pump stations were built in the low level areas of the Southerly drainage shed where sewage needed to be elevated to the nearest interceptor. Of these pump stations, the Jennings Road station constructed in the late 1940s and the Dille Road station constructed in 1960 are the most significant because they capture mostly industrial sewage.


Big Creek Interceptor, 2007

In 2007, the District completed a Facilities Plan Project to develop a 30-year capital improvement program. The purpose of the 30-year program was to establish an operating plan for the plant's future wet weather flows based on implementing the Southerly CSO Long Term Control Plan; establish the priority and schedule for renewal and replacement of aging infrastructure and equipment; and establish a schedule of capital improvements based on future conditions and regulatory requirements.

Evaluations of each unit process at the plant determined short- and long-term recommendations. Many of these recommendations are contingent on the No Feasible Alternative (NFA) evaluation recommendation for the primary effluent bypass developed as part of the Facilities Plan. The NFA evaluation identified and evaluated alternatives that reduce volume and/or provide additional treatment for primary effluent flows that bypass secondary treatment during large wet weather events. Also, the District initiated a project to replace diffusers and piping in the second-stage aeration treatment process, based on the findings of an evaluation performed in the early stages of the Facilities Plan.

The Southerly site along the Ohio Canal and Cuyahoga River, once farmland and a sprawling chemical works, today covers 288 acres. □

1938

Sludge digestion and incineration facilities added in conjunction with construction of Easterly project.

1955

Southerly upgraded to activated sludge secondary treatment.

1960s

Vacuum filters added for sludge dewatering prior to new incinerators.

Plant design flow increased from 36 mgd to 115 mgd.

Plant fed by Big Creek, Southerly, Westerly, Walworth Run, Collinwood, Easterly, Westerly Low Level, and Dugway Interceptors.

1972

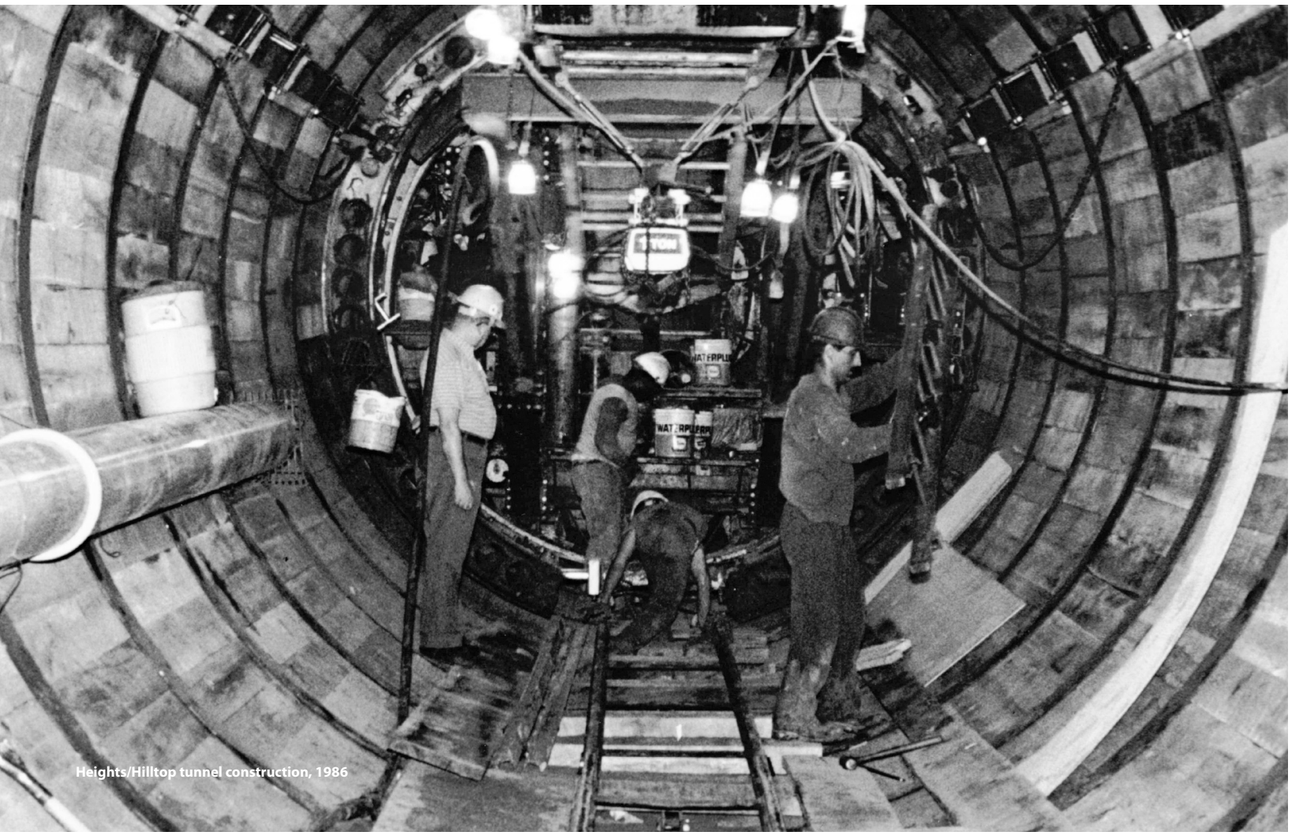
District assumes operation of Southerly.

1974

Major rehabilitation of the Southerly plant begins, with investments of $400 million through 1995.

1988

Southerly reconstruction program completed.



Heights/Hilltop tunnel construction, 1986

The History of Northeast Ohio's Sewer System

Like the plants, Northeast Ohio's sewer system predates the District by several decades. The early sewers served to simply transport sewage away from Cleveland's growing population. But eventually they became the conduit through which wastewater traveled to the plants for treatment. Along the way, the sewers fueled the development of outer-ring suburbs by providing them with access to Cleveland's wastewater treatment plants. This is their story.

ORIGINAL MEMBER COMMUNITIES

Beachwood
Bratenahl
Brecksville
Broadview Heights
Brook Park
Brooklyn
Brooklyn Heights
Cleveland
Cleveland Heights
Cuyahoga Heights
East Cleveland
Euclid
Garfield Heights
Gates Mills
Highland Heights
Independence
Lakewood
Linndale
Lyndhurst
Maple Heights
Mayfield
Mayfield Heights
Middleburg Heights
Newburgh Heights
North Randall
North Royalton
Oakwood
Parma
Parma Heights
Richmond Heights
Riveredge Township
Seven Hills
Shaker Heights
South Euclid
University Heights
Valley View
Walton Hills
Warrensville Township
Warrensville Heights

Interceptor and intercommunity relief sewers

by Kenneth A. Pew

In the late 1800s and early 1900s, city officials thought it would be most efficient to construct a single interceptor sewer system that discharged into Lake Erie at a point about ten miles east of the Cuyahoga River at East 140th Street.

This interceptor sewer system would consist of combined sewers, designed to carry the dry weather flow, or sanitary sewage, from one million people. It would carry 200 gallons per capita per day of sanitary sewage and allow for a 100 percent increase in flow during storms. This, of course, required the construction of storm overflows into the Cuyahoga River and the lake at a number of points.

The main interceptor sewer was completed from West 9th Street to the outfall by 1911, as was the Doan Brook Valley branch interceptor which connected to the main interceptor. The Walworth Run Valley and the West Side Lake Front (from the city limits to West 58th Street) branch interceptors were also completed by this time, but temporarily discharged into the river and lake, respectively. Branch interceptors in the westerly and southeasterly portions of the city still had to be constructed and connected to the main interceptor and required an inverted siphon under the river between West 58th Street and West 9th Street.

In the mid-1900s, a new view gained favor. It advocated dividing metropolitan Cleveland into four major sewage districts—the Easterly, Westerly, Southerly, and Low Level (the immediate areas on either side of the downstream section of the Cuyahoga River), with Easterly, Westerly, and Southerly each having a main interceptor sewer to deliver sewage to a treatment site. Recommended treatment sites were East 140th Street for Easterly, West 58th Street for Westerly, and the Cuyahoga River near East 71st Street for Southerly.

By 1945, main interceptor sewers had been completed in the Easterly, Westerly, and Southerly districts, and plans were being developed for sewers to collect the sewage and industrial wastes in the Low Level District and discharge them into the Easterly, Westerly, and Southerly districts. Meanwhile, the many suburbs that had evolved around Cleveland had constructed separate sewer systems and connected their sanitary sewers to the Cleveland combined-sewer system.

In the 1970s, the need to provide further protection of Lake Erie bathing beaches, particularly at Edgewater Park, became a priority. As a result, Cleveland designed and began to construct the Northwest Interceptor to intercept, store, and convey substantial combined sewer overflow discharges between West 117th Street and West 58th Street to the Westerly Wastewater Treatment Plant. At the same time, the need to decommission numerous small, difficult-to-manage wastewater treatment plants discharging into the upper section of the Cuyahoga River, particularly in the Cuyahoga Valley National Recreation Area, prompted Cleveland and the Cleveland Regional Sewer District to design and construct the Cuyahoga Valley Interceptor.

When the Cleveland Regional Sewer District was formed by court order in 1972, the City of Cleveland transferred 200 miles of interceptor to the District. There did not seem to be any specific criteria to define the Cleveland interceptor sewers, and the original court order had some inaccuracies in defining the District's sewer system. For example, some interceptor flows were incorrectly represented on the maps used to define the District's newly acquired sewer system. The court order also charged the District with constructing the Northwest, Cuyahoga Valley, Southwest, and Heights/Hilltop interceptors, requiring Cleveland to pay for Northwest and the suburbs to pay for the Cuyahoga Valley, Southwest, and Heights/Hilltop.

In the 1980s and 1990s, the Southwest and Heights/Hilltop interceptors were constructed by the Northeast Ohio Regional Sewer District. These interceptors were designed to prevent suburban sanitary sewage from entering the Cleveland combined sewer system and "express" it to the Southerly and Easterly plants for priority treatment.

In 1983, the Ohio Environmental Protection Agency required the District to also construct numerous intercommunity relief sewers and issue Community Discharge Permits to ensure proper use of these interceptors. By the late 1990s, several additional wastewater treatment plants had been decommissioned.

During development of the plans for the Southwest and Heights/Hilltop interceptors, it became obvious that connector sewers were needed to ensure that all communities, particularly those not adjacent to the interceptors, were able to take advantage of the interceptor capacity to be provided. From 1986 to 2006, the District constructed 40 miles of intercommunity relief sewers:

The **Northwest Interceptor** was designed by Cleveland and already under construction when the District was established. The upstream section is a combined interceptor; the downstream section is a combined sewer overflow storage sewer that discharges to the Westerly Wastewater Treatment Plant.

The **Cuyahoga Valley Interceptor** was also designed by Cleveland and began construction when the District was established. It is a separate sanitary interceptor serving 11 communities in Cuyahoga County and nine communities in Summit County. Flows are pumped into the Southerly Wastewater Treatment Plant.

The **Southwest Interceptor** is a separate sanitary interceptor serving 14 communities in Cuyahoga County and one community in Lorain County. Flows are conveyed to the Southerly Wastewater Treatment Plant.

The **Heights/Hilltop Interceptor** is a separate sanitary interceptor serving 15 communities in Cuyahoga County. Flows are conveyed to the Easterly Wastewater Treatment Plant. The interceptor was completed in 2005.

Cuyahoga Valley Interceptor Lift Station, 1978

Heights/Hilltop, 1987

ADDITIONS TO THE SERVICE AREA

Construction of new interceptors has provided capacity to enlarge the District's service area over the years. In addition to the 38 original communities inherited from the City of Cleveland, the District has accepted flows from these additional municipalities:

Bath Township
Bedford
Bedford Heights
Berea
Boston Heights
Columbia Township
Glenwillow
Highland Hills
Hudson
Macedonia
Northfield
Northfield Center Township
Olmsted Falls
Olmsted Township
Orange
Pepper Pike
Richfield Township
Richfield Village
Sagamore Hills Township
Solon
Strongsville
Twinsburg
Twinsburg Township
Willoughby Hills

From top to bottom: Cataract Falls on Mill Creek; combined sewer overflow discharging during severe storm, circa 1990s; combined sewer outfall sealed as part of Mill Creek Tunnel construction, 2003.

Combined sewers and combined sewer overflow control

by Kenneth A. Pew

In the mid-1800s, combined sewers were constructed in Cleveland to simply carry sanitary sewage, industrial waste, and stormwater directly to nearby streams, the Cuyahoga River, and Lake Erie. These first sewers were scarcely more than drains and were built only for local purposes. Nearly 40 years elapsed before a comprehensive system of sewers was adopted by the City.

In the late 1800s, with ten sewers discharging into the lake and 25 discharging into the river—while an increasing number of factories and oil refineries were adding to the river's vile condition—an outcry arose for better sewers. Thus, in April 1882, the City Council appointed a special committee to plan for a comprehensive sewer system. After conferring with engineer Rudolph Hernig of New York, the committee recommended an intercepting sewer to discharge into the lake at Marquette Street.

Plans for a comprehensive sewer system lay dormant until 1885, when Mayor Robert McKisson appointed an expert sanitary commission to study the threefold problem of water supply, intercepting sewers, and river purification. In January 1896, the commission recommended constructing a single interceptor sewer system that discharged into Lake Erie, as described earlier. This interceptor sewer system was designed to receive up to twice the amount of dry weather flow, which necessitated the construction of combined sewer overflows at many points along the river and lake.

In the mid-1900s, Cleveland built many more combined sewers and combined sewer overflows while the maturing suburbs built separate sewer systems. However, the suburbs connected their separate sanitary sewer systems to the existing Cleveland combined sewer system, increasing the frequency and volume of overflows.

In the 1970s, Cleveland formed the Clean Water Task Force in response to a sewer tap-in ban and orders from state and federal agencies. One of the priority tasks was to begin planning for some type of combined sewer overflow control.

The task force began by installing a network of 12 rain gauges and sewer level monitors to help understand how the existing sewer operated. Three prototype in-sewer automated control structures were installed in the mid-1970s—each consisting of air-inflated rubber dams (Fabridams) to control the stormwater outlet and hydraulically operated slide gates to control the dry weather outlet. The structures were monitored and controlled by a central computer facility using analog telemetry over leased telephone lines. The combined sewer overflow control program was transferred to the Cleveland Regional Sewer District in 1972, at which point the Clean Water Task Force was discontinued.

The CSO control system's network of programmable controllers, flow level sensors, and computer-controlled mechanical gates prevent wastewater from spilling into area waters.

The District expanded the concept of in-sewer automated control structures by developing facilities plans for the Easterly, Southerly, and Westerly sewer drainage areas. These plans included a number of off-line combined sewer detention facilities and additional in-sewer control structures. The network of rain gauges was expanded to supply 25 additional automatic control structures. Based on the successful operation of the prototype control structures and the subsequent designs, the District installed 25 more structures in 1979.

In the 1980s, the greatest effort was put into the facilities plans, designs and construction of the Southwest and Heights/Hilltop Interceptors. Even though they were sanitary express interceptors, they significantly reduced the discharge of both dry weather and wet weather flow from separate suburban sewer systems into the Cleveland combined sewer system and thereby, other District interceptors.

In the 1990s and 2000s, the U.S. EPA adopted the Combined Sewer Overflow Control Policy, requiring even more comprehensive facilities plans and the development of a Long-Term Control Plan. The District authorized the development of an overall Master Plan for Combined Sewer Overflow Control, followed by segmented Long-Term Control Plans for Mill Creek, Westerly, Easterly, and Southerly drainage areas. These facilities plans recommended constructing deep tunnel storage for combined wastewater, a technology now widely used in metropolitan areas across the country. Construction of the Mill Creek Storage Tunnel began in 1997.

MORE ABOUT COMBINED SEWER OVERFLOW CONTROL

Costs for First Development of Combined Sewer Overflow Control Plans

The preliminary designs and reports developed through 1978 recommended combined sewer overflow control facilities estimated to cost as follows:

Southerly District (in 1973 dollars)	$51,200,000
Northwest Interceptor Area (in 1973 dollars)	$1,700,000
Walworth Run Area (in 1978 dollars)	$19,000,000
Easterly District (in 1978 dollars)	$114,000,000

Other than these preliminary plans, no significant action specifically addressing combined sewer overflows took place for about a decade. Most emphasis during this time was on wastewater treatment plant renovation and expansion, facilities plans, design, and beginning construction on the Southwest and Heights/Hilltop interceptors. Although these two interceptors were planned to serve separate sewer systems from the suburbs, it was recognized that they would relieve the Cleveland combined sewer interceptors of significant wet weather flow—providing some relief from combined sewer overflow discharges and basement flooding.

1988 National Pollutant Discharge Elimination System Permit

On May 25, 1988, the Ohio EPA issued the first National Pollutant Discharge Elimination System (NPDES) permit for combined sewer overflow discharges to the District that had specific requirements. For example, this permit required the District to establish a schedule to sample at least five combined sewer discharge points on a rotating basis and report occurrences, durations, flow rates, and BODs and suspended solids during the first 30 minutes of discharge. This began in December 1988 and continued until the permit was modified in 1997.

This permit also required the District to place restrictions on tributary communities regarding 1) inflow sources to the sanitary sewer system, 2) construction of new combined sewers, 3) new construction of tributaries to the combined sewer system, and 4) new sewer connections. These restrictions were to be implemented through community sewer-use ordinances.

Finally, this permit required the District to develop and implement an operational plan, integrating best-management practices for both dry- and wet-weather operation and maximizing the volume of flows transported to the treatment plants. The plan was completed and submitted to the Ohio EPA in 1998.

Combined Sewer Overflow Facilities Plan Phase I Study

The Combined Sewer Overflow Facilities Plan Phase I Study began in February 1991. The objective was to take a high-level look at the entire District tributary area, evaluate current technologies for combined sewer overflow control, and set the stage for development of unified, comprehensive facilities plans for each of the plant service areas. This study, completed in 1994, recommended proceeding with development of plans for four individual facilities servicing the Mill Creek Interceptor area, Easterly service area, Big Creek and Southerly Interceptor areas, and Westerly service area.

National Combined Sewer Overflow Policy/ Ohio Combined Sewer Overflow Strategy

On April 19, 1994, the U.S. EPA issued the National Combined Sewer Overflow Policy, which was followed by Ohio EPA's Ohio Combined Sewer Overflow Strategy. These required implementing minimum technology-based controls (the "nine minimum control measures") and developing combined sewer system long-term control plans, based on the "presumption" or the "demonstration" approach. The federal and state governments required the District to conduct a financial capability analysis to phase the implementation of CSO controls to accommodate a community's financial capability.

continued on next page

Storm sewers and stormwater management

by Kenneth A. Pew

In the mid-1900s, some areas of Cleveland and the growing suburbs began departing from building combined sewers to build separate sewers—one for domestic and industrial (sanitary) waste and one for stormwater runoff. As with earlier combined sewers, the storm sewers discharged into the nearest ditch or waterway. Over the years, these separate sewers evolved from being constructed "over/under" (with the storm sewer directly over the sanitary sewer in a common trench) to "side-by-side" (in a common trench) to separate trenches (most commonly on either side of the street). In most cases, the sanitary sewers were ultimately connected to a downstream combined sewer to be conveyed to a wastewater treatment plant for treatment. This subjected the domestic and industrial waste to overflow at many discharge locations. The earlier over/under and side-by-side construction methods also allowed significant storm flow to transfer from the storm sewer to the sanitary sewer, overloading some sanitary sewers and contributing substantially more storm flow to the downstream combined sewers. Even the separate-trench sanitary sewers developed cracks and leaks over time, allowing groundwater to enter the separate, and ultimately, the combined sewers.

Many communities relieved these excessive flow problems by constructing interconnections between the sanitary and storm sewers, creating sanitary sewer overflows. This practice resulted in many stream segments becoming polluted and ultimately culverted. Although considered illegal by U.S. and Ohio EPA, numerous sanitary sewer overflows still exist today.

In 1978, the District completed the first Regional Plan for Sewerage and Drainage (RPSD). However, solving the immediate problems regarding the collection, conveyance, and treatment of domestic, industrial, and storm flow in combined sewers had to take precedence. Even though the primary goal of the District's original court order was to set forth organizational and rate structures to address these problems, it also recognized the secondary long-term need to address the broader issue of intercommunity flooding problems resulting from stormwater runoff. The court order specifically ordered the District to construct one large intercommunity flood control facility: the Lake View Dam, which had already been designed by Cleveland.

In the 2000s, it was time to focus on the secondary goal of addressing intercommunity flooding problems. This priority followed the District's development of the second RPSD in 1999 and the more detailed Regional Intercommunity Drainage Evaluation (RIDE) study in 2002. After much consideration and debate, the District is now on the brink of implementing a comprehensive stormwater management program consisting of a regional stormwater drainage system (similar to the regional interceptor system) along with organizational and rate structures to improve and sustain it. □

MORE ABOUT COMBINED SEWER OVERFLOW CONTROL *continued from page 51*

Costs for Second Development of Combined Sewer Overflow Control Plans

The long-term control plans described above recommended combined sewer overflow control facilities with the following estimated costs:

Mill Creek (in 1995 dollars)	$184 million
Easterly/Doan Brook (in 2002 dollars)	$950 million
Westerly (in 2002 dollars)	$156 million
Big Creek and Southerly (in 2002 dollars)	$468 million

1997 National Pollutant Discharge Elimination System Permit

In February 1997, Ohio EPA issued the second NPDES permit for combined sewer overflow discharges to the District. This permit included many requirements regarding: 1) the nine minimum control measures, 2) structural modifications to regulators recommended in the Phase I Study, 3) a public participation plan, 4) the Combined Sewer System Operational Plan, 5) macroinvertebrate sampling, 6) identification of discharges to state resource waters, bathing waters, and public water supplies, and 7) a discharge notification plan.

This permit also included fixed-date compliance schedules for: 1) the Mill Creek interceptor area facilities plan, 2) the Easterly service area facilities plan, 3) the Big Creek and Southerly interceptor areas facilities plan, 4) the Westerly service area facilities plan, 5) design and construction of combined sewer overflow control facilities in the Westerly service area, and 6) a plan to treat floatable material at the East 55th Street and Kingsbury Run discharges.

The District submitted the application to renew this permit in 2002, but has not received a draft permit.

These long-term control plans were developed for the Mill Creek, Easterly/Doan Brook, Westerly, Big Creek, and Southerly interceptor areas. They were all completed between 1995 and 2002.

Mill Creek Storage Tunnel

Design of the Mill Creek Storage Tunnel began in 1997. Construction of the first segment began in 1997, and all construction is expected to be complete in 2008. □

Lake View Dam

Constructed in 1978, the dam was built in Lake View Cemetery and provides stormwater storage on Dugway Brook to protect areas on the brook downstream of Euclid Avenue. The dam, the largest totally concrete dam in Ohio, is 89 feet high and 520 feet long. It has been routinely used by Cleveland SWAT teams for rappelling exercises and is a frequent stop on Lolley the Trolley sightseeing tours.

Regional Plans for Sewerage and Drainage (RPSD)

The 1978 Regional Plan for Sewerage and Drainage (RPSD) identified 138 storm drainage problem locations. Without a structured approach and funding to solve these problems, the situation has become considerably worse. The 1998 plan identified 334 problem locations—more than double the number in 1978.

Taking into account the U.S. EPA Phase II Stormwater Regulations adopted in 1999 and the renewed public concern about stormwater flooding and other issues (such as erosion and debris), the plans recommended that the District continue to analyze intercommunity storm drainage problems and develop planning-level solutions and cost estimates. The Phase II Stormwater Regulations required all District communities to apply for NPDES Stormwater Permits by 2002 and develop and implement stormwater management programs (which include the U.S. EPA-prescribed Six Minimum Control Measures) by 2007. Other District studies (the Mill Creek Watershed Study, Doan Brook Watershed Study, CSO Phase I Study, Westerly CSO Study, and Easterly CSO Study) clearly demonstrated that stormwater is a major contributor of pollutants to receiving waters. As a result, water quality objectives cannot be met without an integrated approach for sanitary wastewater and storm drainage.

Regional Intercommunity Drainage Evaluation (RIDE) Study

The Regional Intercommunity Drainage Evaluation (RIDE) Study was completed in 2002. It addressed a nearly 358-square-mile area encompassing all or part of 72 communities. It defined a 522-mile intercommunity storm drainage system representing the network of streams, trunk storm sewers, detention facilities, open channels, and other facilities that receive drainage from more than one community. Nearly 75 percent of this system is composed of streams and other open storm drainage systems. The study then evaluated 586 problems (183 concerning flooding, 264 involving erosion, and 139 pertaining to debris) in 328 locations. Finally, it defined the estimated cost of a regional intercommunity stormwater management program:

- The total capital cost of recommended solutions to identified flooding and erosion problems (broken down by conveyance, storage, floodplain management, and erosion control projects) was estimated to be $336.8 million (in 2002 dollars).
- The annual operation and maintenance was estimated at $3.4 million.
- The estimated cost of renewal, assuming that two percent of the system requires renewal each year, was $19.5 million annually.

Regional Stormwater Management Program Development

In 2006, the District began laying the groundwork for developing the level of services, legal authority, regulatory framework, funding stream, organizational structure, and community support to implement a regional stormwater management program based on the findings and recommendations of the RIDE study and benchmarks from other successful stormwater management programs across the country. □

MORE ABOUT STORMWATER MANAGEMENT

11-foot diameter concrete pipes for the Heights/Hilltop Interceptor, 1985

NORTHEAST OHIO REGIONAL SEWER DISTRICT SELECTED AWARDS

American Society of Civil Engineers (ASCE)

Outstanding Civil Engineering Achievement Awards

1988 *Southerly Wastewater Treatment Plant*
2005 *Sewer Collection & Treatment Plant System*

Association of Metropolitan Sewerage Agencies (AMSA) / National Association of Clean Water Agencies (NACWA)

Excellence in Management Award

2003, 2007

Peak Performance Awards

EASTERLY
PLATINUM (5 years with no violations) **1997**
GOLD **1989, 1992-96, 1998-2000, 2006**
SILVER **1990-91, 2001-05**

WESTERLY
GOLD **1996-97, 1999, 2001-02, 2004-05**
SILVER **1987, 1998, 2000, 2003, 2006**

SOUTHERLY
PLATINUM (5 years with no violations) **2002**
GOLD **1988, 1990, 1992-93, 1995-96, 1998-2001, 2005**
SILVER **1987, 1989, 1991, 1994, 1997, 2003, 2006**

Public Information and Education Awards

1993 *20th Anniversary Poster and Booklet*
1997 *"Celebrating Cleveland's Bicentennial: A Gift of Clean Water" (1996 Annual Report)*
1999 *Clark Elementary School Corporate Partnership and Related Outreach Activities*
2001 *"Uncovering Cleveland's Sewer System" (Video)*

Public Service Awards

1992 *Cuyahoga River Remedial Action Plan*
2001 *Chevrolet Branch of Big Creek Project: Reversing Stream Bank Erosion*
2003 *Doan Brook Study Committee*

Auditor of State of Ohio

Ohio Auditor's Award

2004

Government Finance Officers Association (GFOA) of the United States and Canada

Distinguished Budget Presentation Award

2007

Excellence in Financial Reporting Certificate of Achievement

1997-2007 *Comprehensive Annual Financial Report*

Ohio Water Pollution Control Association (OWPCA) / Ohio Water Environment Association (OWEA) / Water Environment Federation (WEF)

George W. Burke, Jr. Award

EASTERLY
1995-96

INDUSTRIAL WASTE / WQIS
1985, 1992, 1997

Outstanding Facility Award

SOUTHERLY
2005 *Exemplary Record of Compliance*

Safety Awards

EASTERLY
1987, 1989, 1991-93, 1995, 2002

WESTERLY
1998-2001, 2003, 2006

SOUTHERLY
1993, 1995-96, 2000, 2006

SSMO
2001, 2003, 2006*

INDUSTRIAL WASTE / WQIS
1984-87, 1991, 1993, 1995-96, 2002*

*Collection System of the Year Award

United States Environmental Protection Agency (U.S. EPA)

Excellence Awards

EASTERLY
1997 *Operation and Maintenance Excellence, Water Pollution Control Facility, Large Secondary Category (FIRST PLACE)*

SOUTHERLY
1997 *Outstanding Operation and Maintenance, Water Pollution Control Facility, Large Advanced Category (FIRST PLACE)*
2000 *Outstanding Industrial Stormwater Control Program (NATIONAL FIRST PLACE AWARD)*
2000 *Optimal Use of a Waste Heat Boiler Recovery System During Incineration (SPECIAL NATIONAL AWARD)*

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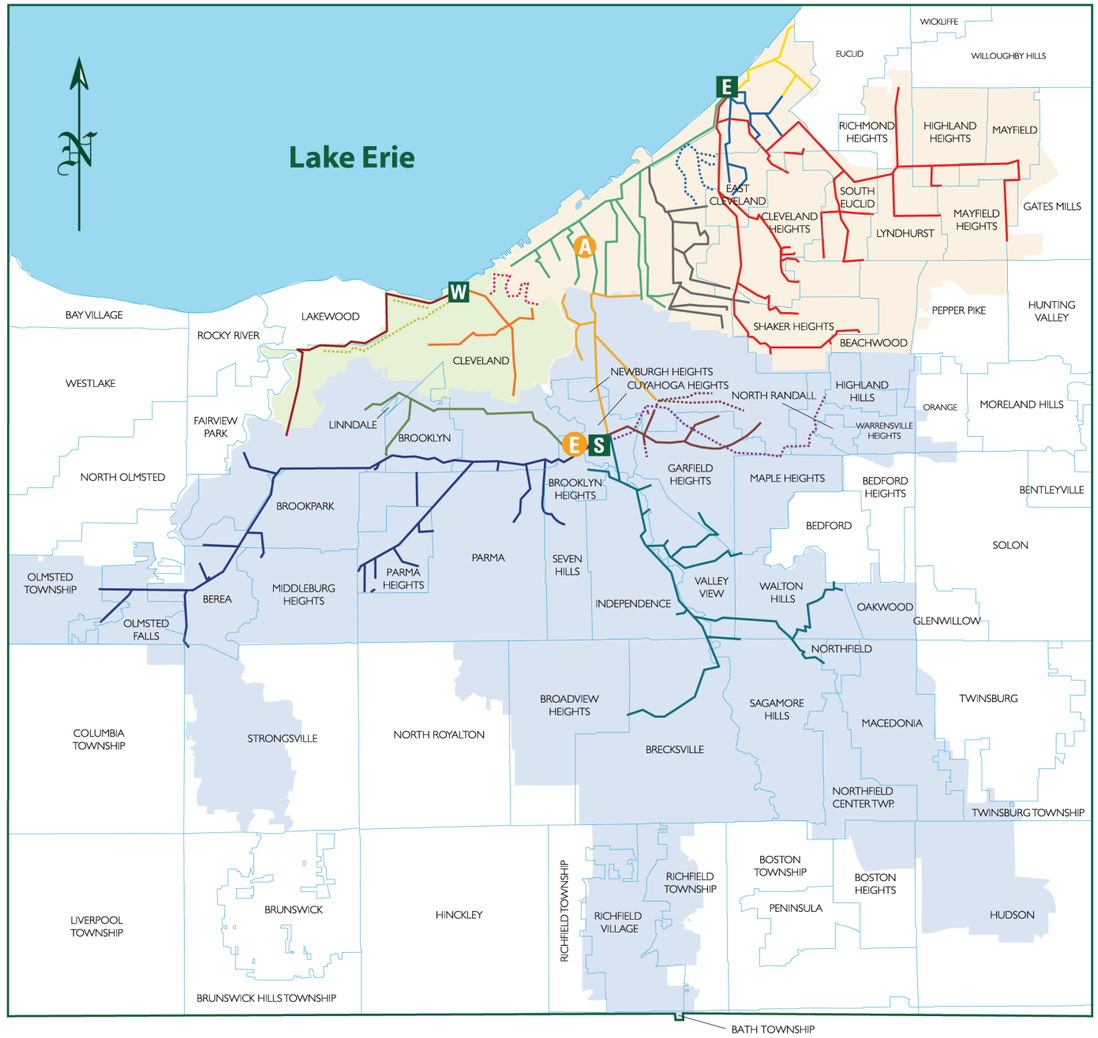

District Service Area Map

LEGEND

- **A** **McMonagle Administration Building** — 3900 Euclid Avenue
- **E** **Environmental & Maintenance Services Center** — 4747 E. 49th Street
- **E** **Easterly Treatment Plant** — 14021 Lakeshore Boulevard
- **S** **Southerly Treatment Plant** — 6000 Canal Road
- **W** **Westerly Treatment Plant** — 5800 Cleveland Memorial Shoreway

- **Easterly service area**
- **Southerly service area**
- **Westerly service area**

EASTERLY INTERCEPTOR SYSTEM

- Easterly
- Doan Valley
- Dugway
- Heights/Hilltop
- Collinwood (Hayden/Ivanhoe)
- Lakeshore/Nottingham

SOUTHERLY INTERCEPTOR SYSTEM

- Big Creek
- Cuyahoga Valley
- Mill Creek
- Mill Creek (under construction)
- Southwest (West Leg)
- Southerly

WESTERLY INTERCEPTOR SYSTEM

- Low Level
- Northwest
- Westerly
- Walworth Run