

A Rationale for Completing Public Sewers around Chautauqua Lake

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September 2020

Public sewer systems are nothing new. In fact, they have been around for a long time, perhaps a very long time, depending on how one thinks of history. Sanitary drainage systems were in use in Mesopotamia as early as 4000 BCE. The Indus and Aegean civilizations recorded wastewater drainage systems around 3000 BCE, Egypt and Palestine by 2000 BCE. By 200 BCE, sewage in Athens was delivered to a collection basin from which it was conveyed through conduits to irrigate and fertilize orchards and field crops, a practice not advised today.

It is important to note that Asian civilizations also developed sanitary drainage systems. Considering what I learned about history at various points in my education, I think it unfortunate that what was taught focused on European or “Western” history, I best remember information about such large cities as Paris and London, where sewage was reported as flowing in open street gutters. Such conditions led to epidemics of various diseases: cholera, botulism and typhoid fever, to name just a few caused by bacteria. Other types of causative organisms include viruses, algae and parasitic protozoa and worms. It is largely because of outbreaks of such waterborne diseases that public sewage systems were developed, constructed and improved. Those involved in our “sewer the lake” endeavor are still striving to make improvements.

Here in the United States, people living in areas of low population density still do not have public sewers. For example, my wife and I live in the hamlet of Frewsburg where we do have a public water supply but not a public sewer system. Instead, as is typical of such areas, we rely on our individual dwelling septic system for safe, sanitary sewage disposal. Such is the case now for approximately 1/3 of the shoreline area of Chautauqua Lake. Putting it another way, homes and businesses around 2/3 of the shoreline of Chautauqua Lake are now served by public sewers.

Figure 1 shows the several public sewer systems now in place around Chautauqua Lake. These include the South Chautauqua Lake Sewer District, the Center Chautauqua Lake Sewer District, the North Chautauqua Lake Sewer District, the Chautauqua Utility District (serving primarily Chautauqua Institution), and two private districts serving condominium complexes on the shore of the lake’s north basin. The combined South and Center Districts are operated by a single staff and overseen by a common Board of Directors.

A Brief History of the South and Center Chautauqua Lake Sewer Districts

Note: In 2013, the Districts produced a booklet, which provided information about the Districts. This section is modified from that document.

In 1967, the Chautauqua County Legislature hired an engineering firm to conduct a comprehensive sewerage study for the county. The study recommended a regional plan for a public collection system and treatment facility for numerous areas within Chautauqua County in order to protect the public health and to preserve

the County's water resources, including Chautauqua Lake and its tributaries. That study led to the formation of the South and Center Chautauqua Lake Sewer Districts in 1970. The Center District serves portions of the Town of Ellery including the areas of Maple Springs, Bemus Point, Oriental Park, Arnold's Bay, Colburns, and also Midway and Long Point State Parks. The South District serves other portions of the Town of Ellery, the Fluvanna Area in the Town of Ellicott, "West Ellicott," the areas of the villages of Celoron and Lakewood formerly served by their separate old systems, and the areas of Vukote, Loomis Bay, and Ashville Bay.

Federal and state grants were awarded to Chautauqua County and construction on the treatment plant in Celoron was begun in the late 1970s. On March 10, 1980, the present treatment plant went online serving Celoron and Lakewood, replacing their former separate and inadequate treatment plants. Additionally, five major interceptor pumping stations were constructed on both the north and south sides of the lake. They remained unused for four years because key interceptors linking them to the treatment plant were not constructed because of costs that were escalating for various reasons. Soil conditions were the primary factor.

In early 1982, the County made one final effort to complete the halted project with public backing by reevaluating previous decisions and plans, adopting a new engineering plan to complete the regional collection system and to serve all the areas originally proposed. The reevaluation recommended, in part, a change in sewer technology from the original approach, using vacuum and low-pressure sewers in order to lessen both the high construction costs and the environmental problems associated with gravity sewers in certain areas. It also recommended that the original scope of the collection system be reduced to cover only those areas deemed the most critical public health concerns and the differing population densities to make it affordable to the users at the time. Following the changes and recommendations, the installation of the new collection system infrastructure proceeded. The Bemus Point pump station went online in 1986, and the Celoron treatment plant began treating wastewater from homes and businesses on the Lake's east side. Now, some 3 decades later, the Districts are, with County and State support, well along in the project to extend the public sewer system along the west side of the lake to Stow.

Sewage Disposal and Treatment As It Relates To Environmental and Public Health

I have been involved with public health matters relating to Chautauqua Lake for six decades, beginning in 1960. During those years, I have heard many times the most common misperception about the private dwelling septic systems of lakefront homes – the idea that many of them commonly discharge sewage directly from the dwelling or from the septic tank into the lake, or to a tributary stream or ditch, via a pipe. During the summer of 1964, Bill Mealy and I conducted a house-to-house environmental health study for the NYS Department of Health in some areas of the lakeshore, including portions of the Towns of Chautauqua, North Harmony and Busti. (Chautauqua County did not form a County health department until 1965.) That study identified private well contamination and illegal or failed septic systems discharging to the lawn/ground surface, to nearby streams and ditches, and to the lake itself. During the summer of 1982, I conducted a similar study for the County Health Department, assisted by five college students. Data collected during this study were similar to those obtained in the 1964 study, but involved South and Center service areas in the Towns of Ellery, Ellicott, and Busti. While some violations to tributaries and the ground surface were observed, only one home discharging directly from the septic tank to the lake was found.

That does not mean that other violations of the County Sanitary Code were not observed and recorded during the surveys. During the 1982 study, residents of 819 homes in the South District were contacted. Of the 819 homes, 106 (12.9%) had sewage violations, which included pipes, ditches and/or groundwater.

Sewer Systems, Public Health, and the Environment

Municipally owned wastewater collection and treatment facilities in New York State, such as the South and Center Chautauqua Lake Sewer Districts, are regulated by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) and must meet rigid standards relating to environmental and human health. Private, individual dwelling septic systems in Chautauqua County are regulated by the Chautauqua County Department of Health and Human Services and must comply with the State and County Sanitary Codes.

Sewage contains human wastes – urine and feces – and also contains various chemicals. Some of the chemicals are considered harmful to the environment, notably phosphorus and nitrogen. (I am not considering here such common household chemicals as cleaning and disinfection agents, etc.) Both of those chemicals – phosphorus and nitrogen - are of concern because they, in various forms, are necessary nutrients for the growth of aquatic plants, including undesirable invasive weed species common in Chautauqua Lake, and also harmful cyanobacteria, formerly known as blue-green algae. During summer months, cyanobacteria respond to warm temperatures and the availability of phosphorus and nitrogen by rapid reproduction, producing “blooms” known as Harmful Algae Blooms (HABs). Of the two chemicals, phosphorus has been the more important one here because the USEPA and NYSDEC have issued a Total Maximum Daily Load (TMDL) notification for its regulation and control in Chautauqua Lake. The national TMDL program, established under Section 303 (d) of the Clean Water Act, focuses on identifying and restoring polluted streams, rivers, lakes, and other surface water bodies. At this time, the only TMDL issued for Chautauqua Lake is phosphorus, but a TMDL for nitrogen may be issued for the lake in the future.

Along with environmentally important chemicals such as phosphorus and nitrogen that serve as fertilizers for undesirable and/or harmful aquatic plants, algae and cyanobacteria, sewage contains other species of bacteria. Some of those bacteria are part of our normal intestinal “bacterial flora” and, as such, are not of concern; in fact, they are beneficial. Other bacterial species, however, can cause disease. In addition to bacteria, other disease-causing microorganisms such as viruses and protozoa can be contained in sewage, which, if not disposed of properly, can infect people. Sewage transported and treated in a sewage treatment system, such as the South and Center Districts, either removes or kills these disease-causing organisms. In contrast, individual dwelling septic systems rely on the elimination of the organisms in the groundwater after passing through the system’s tank and distribution system. (*Figure 2*)

After passing through the septic tank and the distribution system (commonly a “tile field”), the sewage water, along with any chemicals and microorganisms, becomes part of the groundwater. Groundwater is not static - it moves! The groundwater surrounding a private dwelling can move to a nearby ditch, a stream, the lake, or it may end up being pumped by the dwelling’s water well system back into the house to be used once again by those who live there. If a nearby neighbor has their own individual water well, that well may be providing those residents with water contaminated by sewage from their own septic system or from a neighbor next door. Small lakefront lots, common in some areas of the Chautauqua lakeshore, contribute to that possibility. Data from the 1982 house-to-house survey showed that, of the 148 private water wells samples, 66 (44.6%) were contaminated, either by sewage from their own septic system or that of a neighbors. That value of 44.6% is almost identical to the results summarized by the County Health Department after sampling over 900 homes across Chautauqua County during recent years.

Two other factors may become important in the possible contamination of lake waters by sewage. First, if it has been raining, and, second, if perhaps it is a holiday weekend and lakefront homeowners have many relatives or guests for the day or a weekend, then the ground can become saturated to the point where the

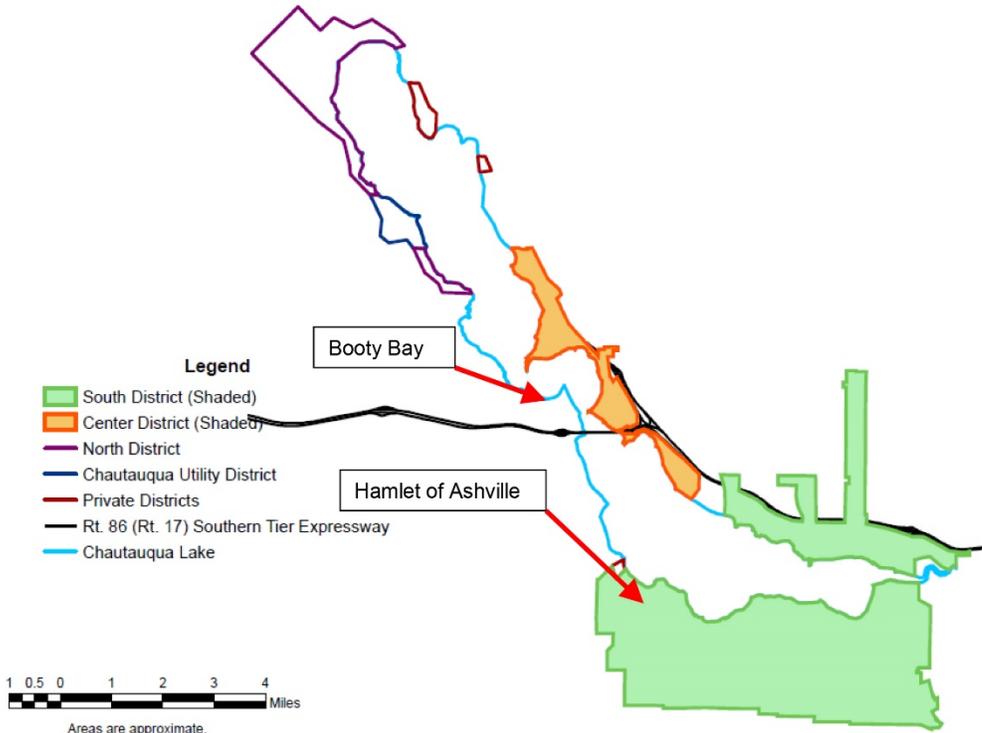
water moves more rapidly to the lake, carrying pollutants with it, including phosphorus, nitrogen and microorganisms. As a result, the ecological integrity and balance of the lake will be negatively affected.

Conclusions

Following the 1982 survey and study, the County Health Department made a significant effort to inform the public about the results of the study. Public meetings were held and a series of local news articles highlighted the importance of public sewers for the improvement of both public and environmental health. Figure 3 includes two examples of those news reports. The end result was the completion of the South and Center Chautauqua Lake Sewer Districts. Many people, including Districts staff members, Districts Board members, members of the Chautauqua County Legislature and other County officials, along with numerous other involved and concerned citizens, have been actively involved in the effort to continue the progress already made to extend public sewers around all of Chautauqua Lake. The current Phase 1, Westside Extension to Stow, is part of that effort.

The conclusion here is basic and easily reached – public sewers, with their collection and conveyance of sewage wastes to a centralized wastewater treatment facility, have many advantages over private, individual dwelling septic systems. Public systems treat and dispose of sewage in a state and federally regulated, professionally monitored and safe way that lowers the risk of human health problems and environmental damage. By comparison, homeowner septic systems must be individually maintained and carry the risk of contaminating either the environment, one's own water supply, or possibly that of a neighbor. Public sewers and sewage treatment methods and technology have come a very long way during the past several millennia. As a result, our human lives have been improved, illnesses and death by waterborne diseases have decreased dramatically, and our environment is healthier. Public sewers just make good sense!

SEWER DISTRICTS AROUND CHAUTAUQUA LAKE



Note: Figure initially created by SCCLSD

 CLIENTS PEOPLE PERFORMANCE AMHERST, NEW YORK DATE: 09/11 JOB No.: 8614657	SOUTH & CENTER CHAUTAUQUA LAKE SEWER DISTRICT
	FIGURE 1-1 SCCLSD SERVICE AREA

Figure 1
Sewer Districts around Chautauqua Lake

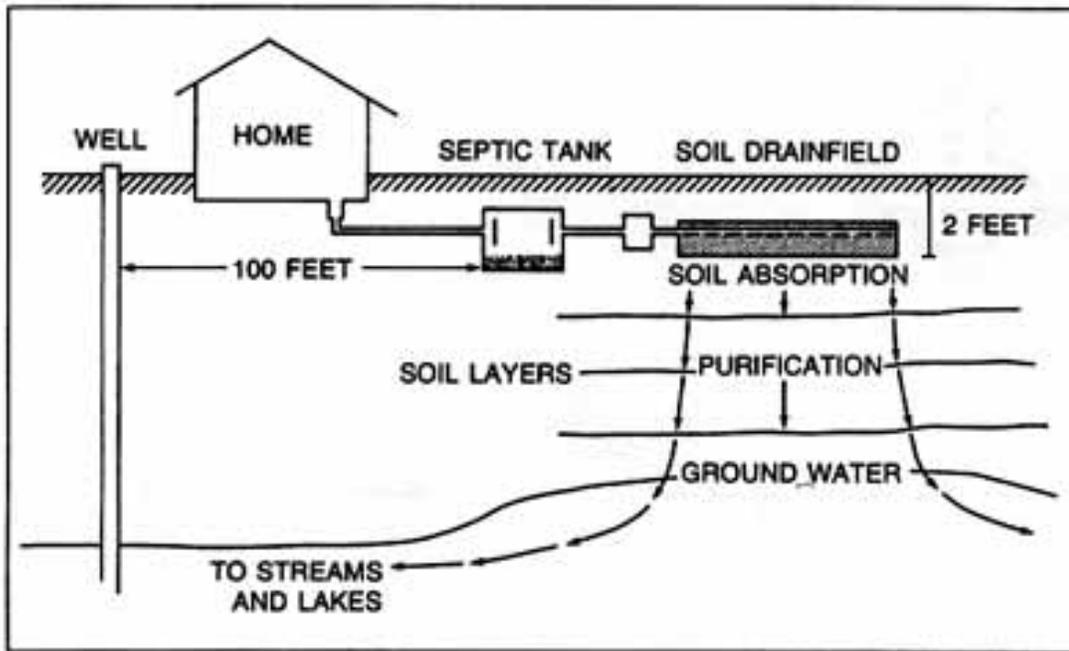


Figure 2
Diagram of
a Typical
Individual
Dwelling
Septic System

THE POST-JOURNAL, Jamestown, New York—Thursday, September 16, 1982

Study Points Out Need For New Regional Sewage System

By MATTHEW SPINA
The study released yesterday on pollution problems in the South and Center Chautauqua Lake Sewer Districts again demonstrates the need for a regional sewage system in those areas, County Executive Joseph Gerace said today in his first public statement on the findings.

Gerace, who recently returned from a conference of the state Association of Counties at Grossingers, said he was not surprised by the report.

"If you go up in some areas, you can see the stuff right on the ground," he said.

The "stuff" is sewage seeping from 106 homes in the area into ditches, streams and Chautauqua Lake. Fecal coliforms, a term for sewage bacteria, has turned up in ground water, pipes, drainage ditches and water wells.

Researchers found that 66 of 148 private wells sampled contained fecal coliforms and other bacteria making water from them unfit for human consumption.

Residents who tap water from those wells have been advised to chlorinate them.

At a press conference yesterday, county Environmental Health Director Steven Johnson said fecal coliforms and other bacteria in water wells have probably been a source of disease for some time. But he said he is unsure of just how long the problem has existed or to what extent the public's health has been effected.

"It's safe to assume that people have

become sick" with diseases that may have been transported through their contaminated water, he said.

At one time, many lake-side areas were inhabited only during the summer. But when those areas began to support year-round residents, sewage problems grew worse in areas such as Vukote, Shore Acres and Martha's Vineyard.

Those areas seem to have the most severe pollution problems, said biologist Dr. Thomas Erlandson, who, with four undergraduate science students, collected the data from 800 dwellings.

The study does not state the source of the contamination, but contaminated water and leaking septic systems seem to be more than coincidental, county officials said.

The sewer construction project was stopped July 14, 1981 when an overwhelming majority of residents in both districts, frustrated by years of construction cost overruns, decided to halt

the project. They voted down a referendum to raise the costs of construction.

Since then, county officials and involved citizens have searched for sewage collection alternatives and how to best use \$19 million in state and federal funds earmarked for a sewer project. An ad-hoc committee of the County Legislature is reviewing an engineer's report and is preparing alternative recommendations to the full legislature.

Post-Journal 10/29/82

Board Of Health Urges Completion Of Sewers

By ANN E. WEIDMAN
MAYVILLE — The Chautauqua County Board of Health last night took steps to begin de-politicizing the South and Center Sewer districts.

Based upon state law and an environmental health study conducted this summer, the board established a strong policy signifying its intent to persuade residents of the districts, a legislative ad hoc committee and various municipal officials to support the Malcolm-Pirie plan, "pass the referendum and resolve the problem permanently."

The strongest argument, as noted by new board member Dr. John Forbes, is the conclusion reached in an eight-week

study this summer by Dr. Thomas Erlandson, professor of biology at Jamestown Community College, several undergraduate students and David Palmer and William Steubing of Jamestown.

The report states: "As a biologist, I (Dr. Erlandson) must conclude that the results of our study expose some very serious environmental health problems within the South and Center Chautauqua Lake Sewer districts. It is not a healthy situation when 45 percent of the homes surveyed are supplied with contaminated drinking water. It is not healthy to have 106 homes discharging sewage where people are exposed to it,

and where disease-carrying insects and vermin can get at it. It is not healthy to have ditches and pipes contaminated when one doesn't even know the source of contamination. It is not healthy to have entire neighborhoods living with contaminated ditches along the street and pipes discharging fecal bacteria into surface water. It is not healthy to have the very ground water contaminated with fecal bacteria so abundant that one cannot even count colonies in a culture plate.

Dr. Erlandson's conclusion added that "It is true that some sections of the two sewer districts are more environmentally healthy than others. Yet now, in the last quarter of the 20th

century, there are those among us living with sanitary conditions reminiscent of medieval Europe. In fact, early London and Renaissance Venice were better off — at least they had the Thames and the tides to carry their sewage away.

"The question to be answered by district residents is this: do we accept these conditions, or do we try to change them?", the study asked.

With residents unhappy about projected costs of completing the sewer projects, Dr. Robert Berke, health commissioner, said last night that the county must also be concerned that, without sewers, sewage will be dumped

into the lake.

Forbes responded, "What you're saying is that for the price, you're ending up with a bargain. If there is evidence of gross pollution in the districts, the board of health has no choice but to take a non-politicized stand."

Berke said that what faces the board is how to present the case for health against the kind of vocal, loud groups that break up meetings. "We have to be prepared. This is a complicated issue."

Board member Henry Weiler Jr. added that the apathy or inertia which cause people to vote no must be overcome.

In other business, Berke reported on

a program being used in the Jamestown primary schools to teach all aspects of good health habits and preventive medicine, including drug and alcohol abuse.

The health commissioner said the only obstacle to incorporating the program in all school curriculums is funding.

The board asked that a representative of the Jamestown program attend a meeting to explain the program and its results.

Berke also reported that the state is about \$250,000 in arrears for funded health programs, for which the county has already paid.

Figure 3
Examples of 1982 News Reports