

City of Buchanan

WASTEWATER
TREATMENT PLANT
WORKSHOP 2015





City of Buchanan

Wastewater Treatment Plant Description & Process Summary

WWTP Description



- Designed 1.5 MGD average flow
- Max 3.75 MGD flow
- Class “B” Activated Sludge Type Plant with Primary, Secondary, & Tertiary clarification
- Anaerobic Digestion
- UV Disinfection



National Conditions

The State of Water/Wastewater
Infrastructure in the U.S.

National Conditions

- Since 1972, Congress has directly invested more than \$77 billion in the construction of publicly owned treatment works and their related facilities. State and local governments have spent billions more over the years. Total nonfederal spending on sewer and water between 1991 and 2005 was \$841 billion. Nevertheless, the physical condition of many of the nation's 16,000 wastewater treatment systems is poor due to a lack of investment in plants, equipment, and other capital improvements over the years.

National Conditions



- In 2008, the U.S. Environmental Protection Agency (EPA) reported that the total investment needs of America's publicly owned treatment works as of January 1, 2004, were \$202.5 billion. This reflects an increase of \$16.1 billion (8.6%) since the previous analysis was published in January 2004.

National Conditions



- In 2002, the Congressional Budget Office (CBO) estimated that for the years 2000 to 2019, annual costs for investment would need to be between \$13 billion and \$20.9 billion for wastewater systems.

National Conditions

- Many systems have reached the end of their useful design lives. Older systems are plagued by chronic overflows during major rainstorms and heavy snowmelt and are bringing about the discharge of raw sewage into U.S. surface waters. The EPA estimated in August 2004 that the volume of combined sewer overflows discharged nationwide is 850 billion gallons per year. Sanitary sewer overflows, caused by blocked or broken pipes, result in the release of as much as 10 billion gallons of raw sewage yearly, according to the EPA.

National Conditions

- In September 2002, the EPA released a detailed gap analysis, which assessed the difference between current spending for wastewater infrastructure and total funding needs. The EPA Gap Analysis estimated that over the next two decades the United States must spend nearly \$390 billion to replace existing wastewater infrastructure systems and build new ones (the total includes money for some projects not currently eligible for federal funds, such as system replacement, which are not reflected in the EPA State Needs Survey).⁵

National Conditions



- Construction, operation and maintenance, and reconstitution of service of wastewater infrastructure is expensive, and the monetary and societal costs incurred when this infrastructure fails are high. Aging, under-designed, or inadequately maintained systems discharge billions of gallons of untreated wastewater into U.S. surface waters each year.

National Conditions



- If the nation fails to meet the investment needs of the next 20 years, it risks reversing public health, environmental, and economic gains of the past three decades.

National Conditions

- The case for increased federal investment is compelling. Needs are large and unprecedented; in many locations, local sources cannot be expected to meet this challenge alone and, because waters are shared across local and state boundaries, the benefits of federal help will be disseminated throughout the nation. Clean and safe water is no less a national priority than are national defense, an adequate system of interstate highways, and a safe and efficient aviation system. Many other highly important infrastructure programs enjoy sustainable, long-term sources of federal backing, often through the use of dedicated trust funds; under current policy, water and wastewater infrastructure do not.

National Conditions

Design Life of Wastewater Systems

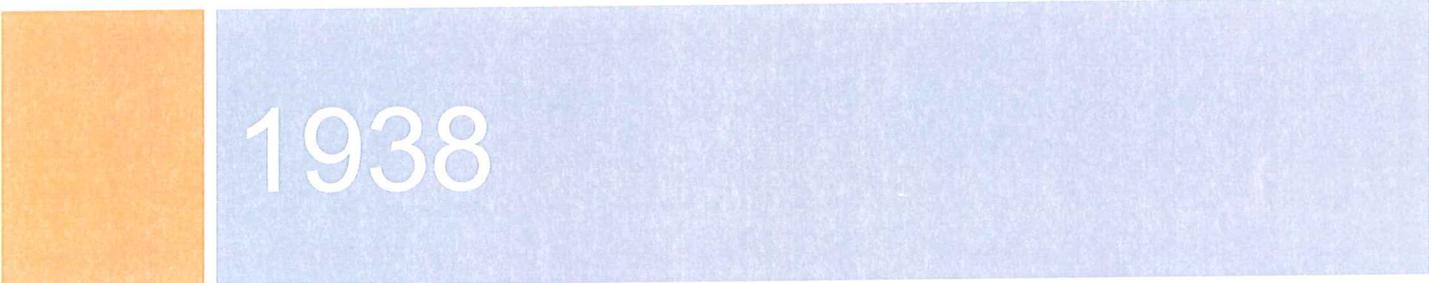
Components	Years of Design Life
Collections	80 - 100
Treatment Plants - Concrete Structures	50
Treatment Plants - Mechanical & Electrical	15 - 25
Force Mains	25
Pumping Stations - Concrete Structures	50
Pumping Stations - Mechanical & Electrical	15
Interceptors	90 - 100

SOURCE: Clean Water and Drinking Water Infrastructure Gap Analysis Report, p. 11, EPA 816-R-02-020, September 2002



City of Buchanan

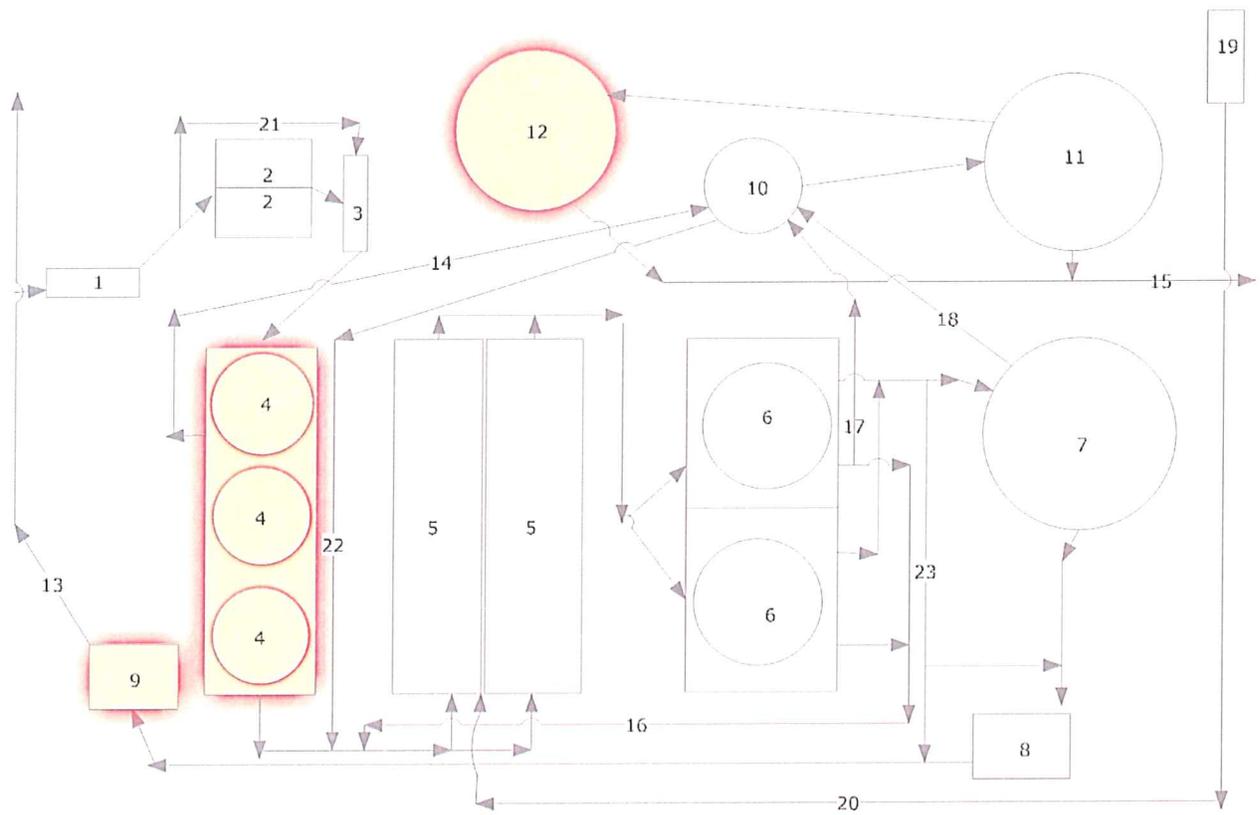
Wastewater Treatment Plant Evolution

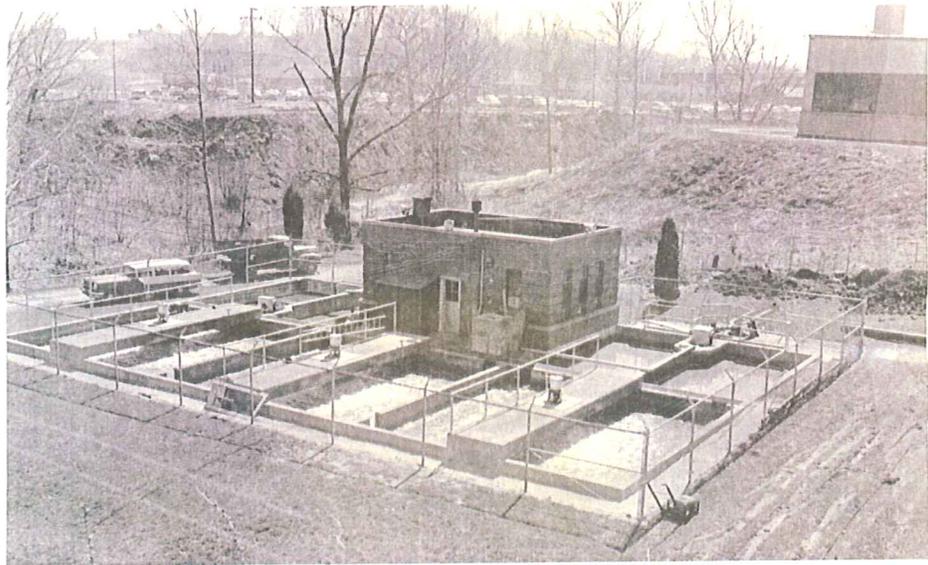


1938

Original Primary Treatment
Plant

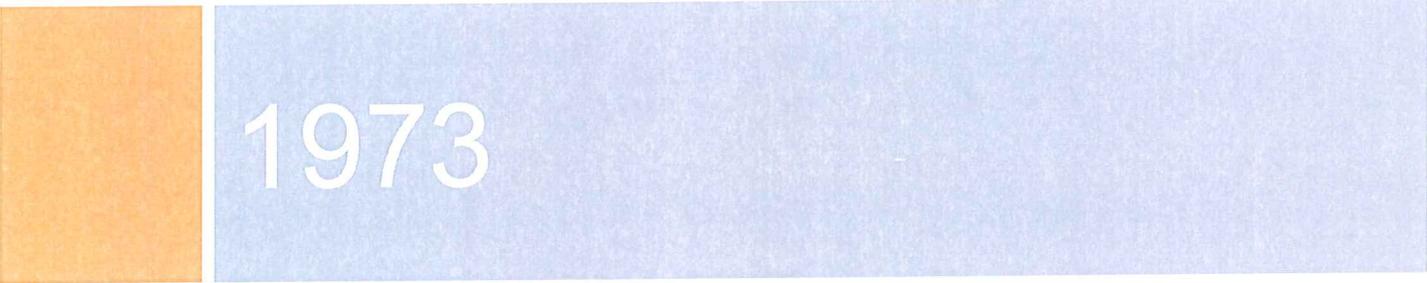
1938 Sections still in use





City of Buchanan, WWTP circa
1940

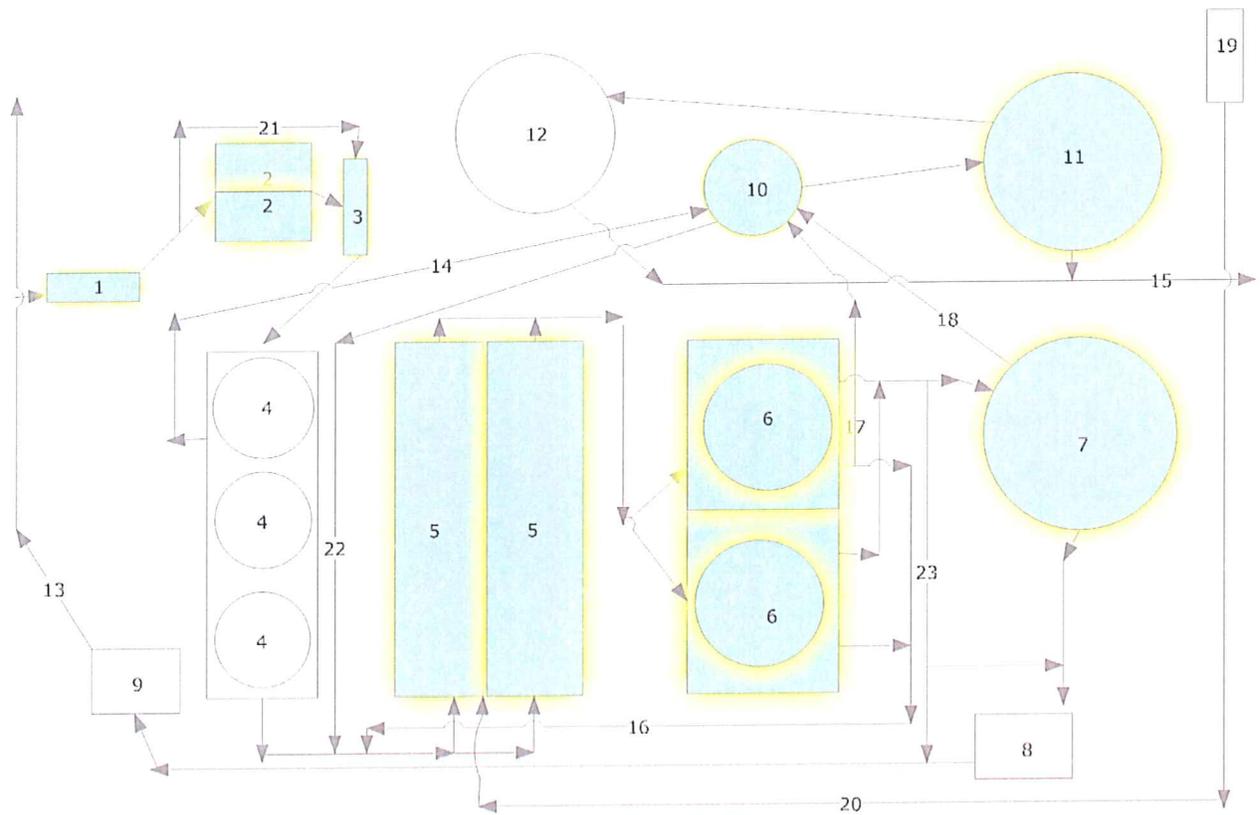
*Original Primary Treatment
Plant*

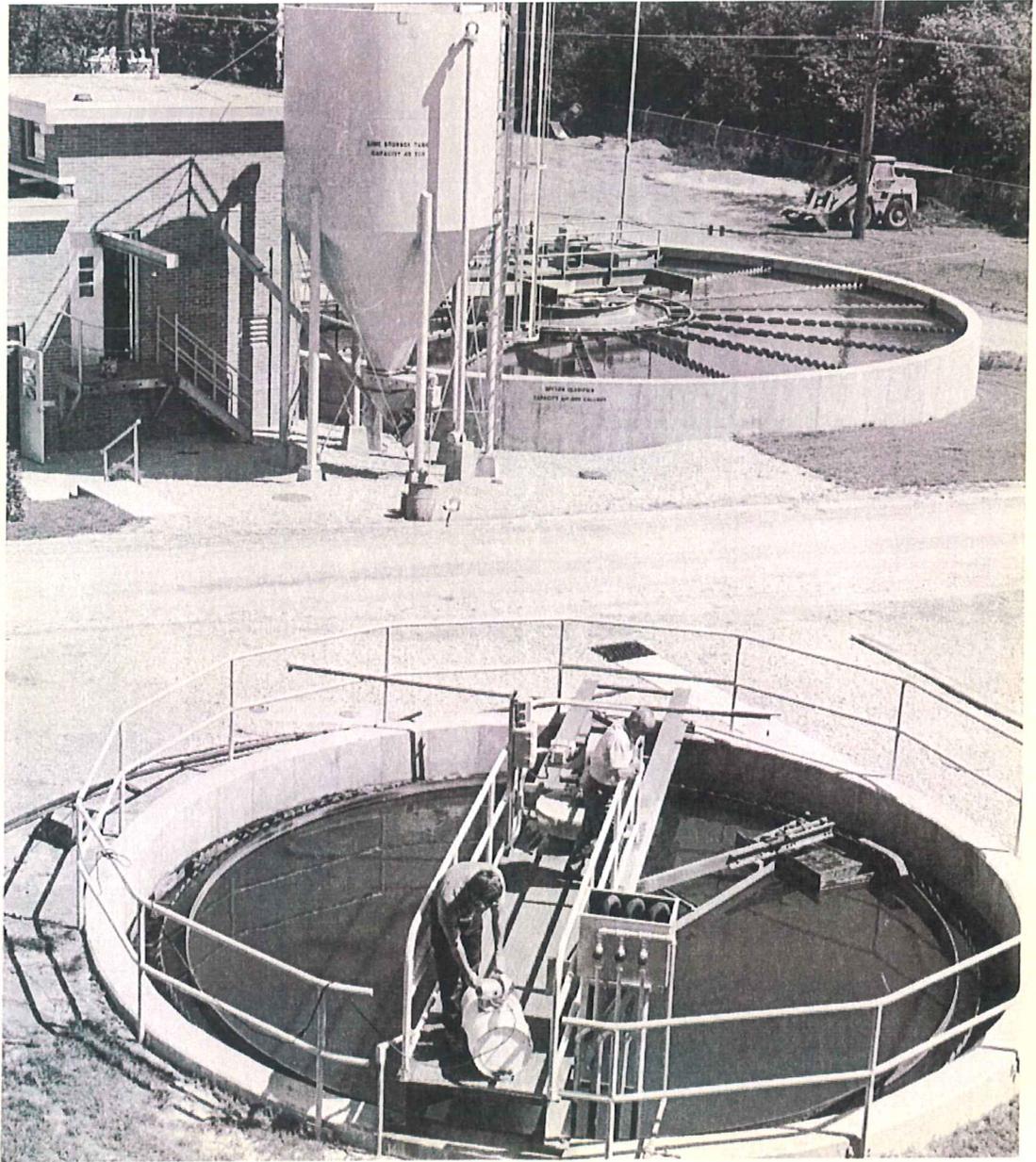


1973

Next stage in the evolution of the WWTP. Converted to Activated Sludge Type Treatment Plant.

1972 Upgrades





City of Buchanan, WWTP circa 1973

Sludge Thickening and Tertiary Clarification



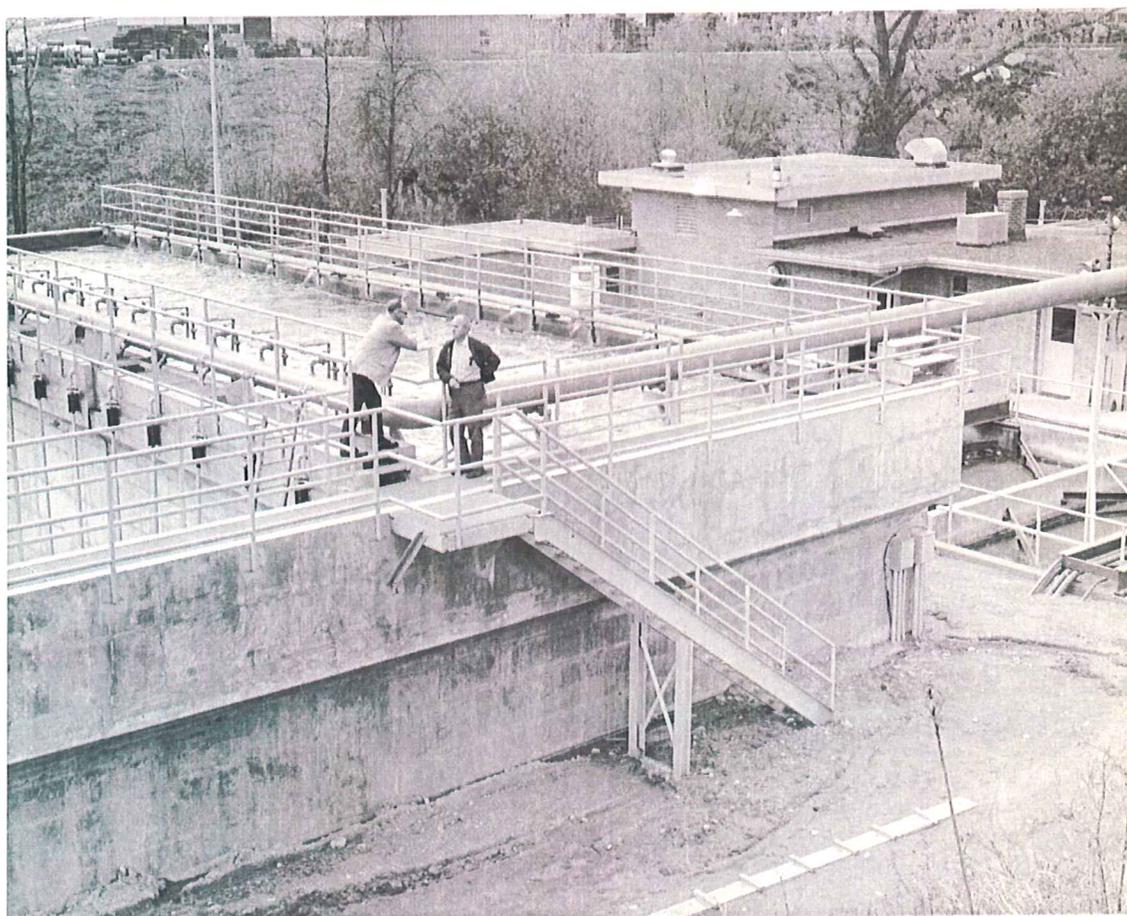
City of Buchanan, WWTP circa 1973

Overview of redesigned "New" Plant

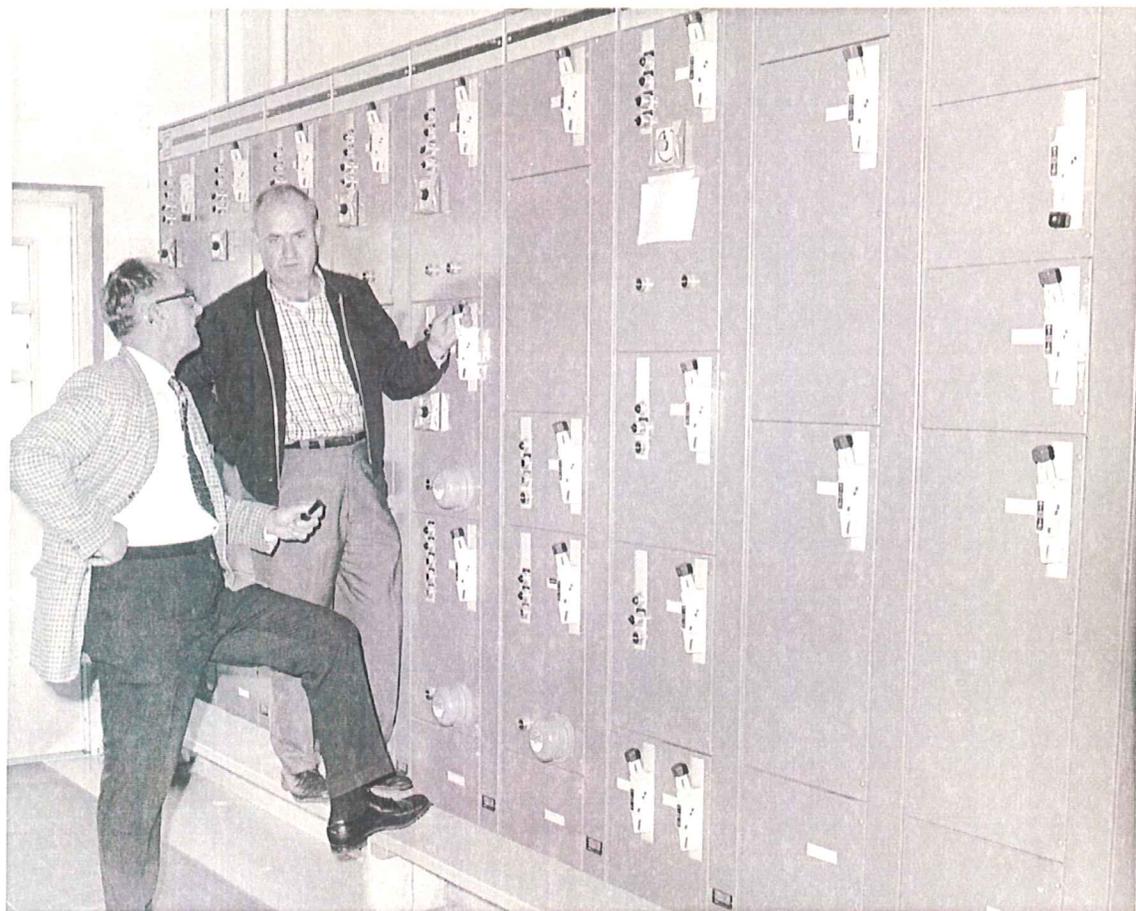
1973 combining old with new



1973 cont.



1973 cont.





2009 Upgrades

2009 Upgrades



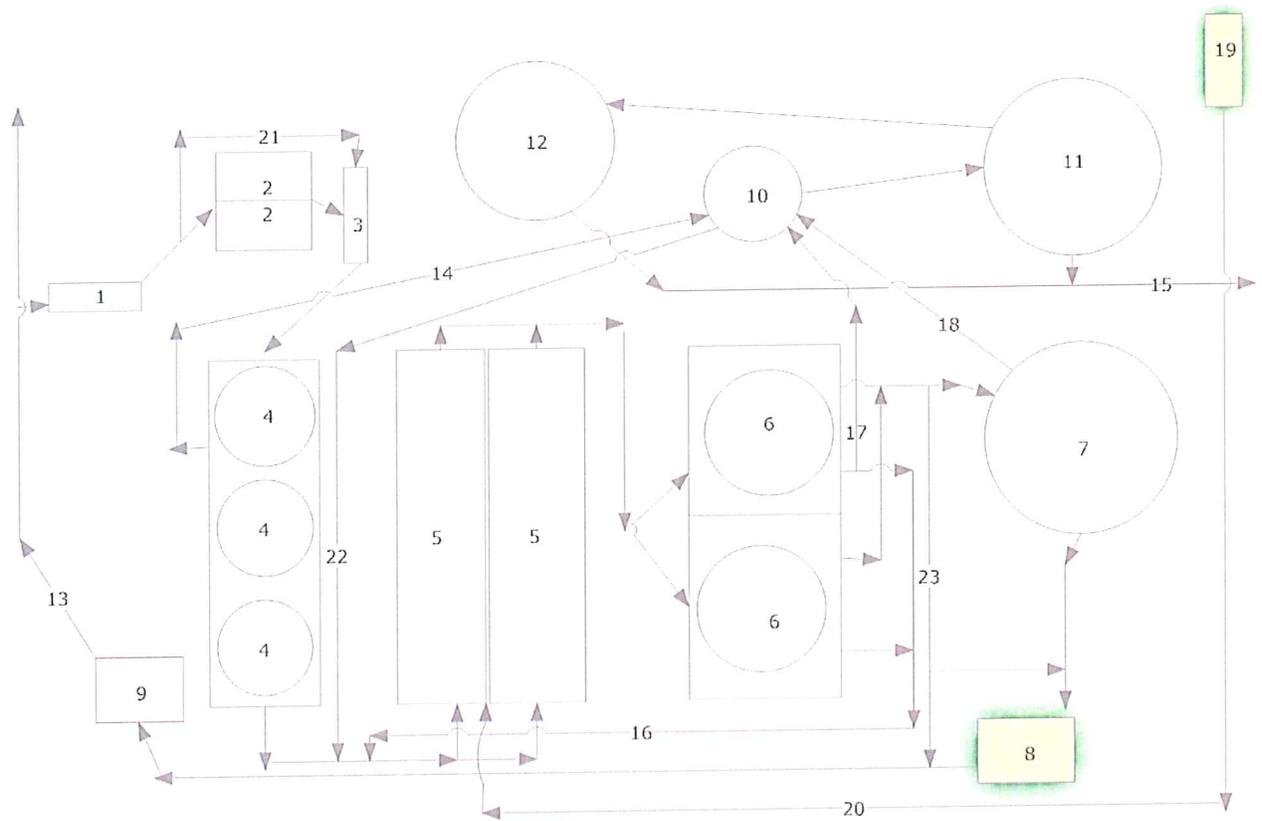
- Ferrous Storage Tanks
- Aeration Basin diffusers & mud valves
- UV Disinfection System
- Access Gate and Road
- Refurbished Sand Filtration Drying Beds
- Digester Cleaning/Modification
- VFD controllers
 - Blowers
 - Primary Effluent Pumps
 - Final Effluent Pumps

2009 Upgrades cont.



- Lift Station Upgrades
 - Onsite Generator at Schirmer Parkway
 - 4 new control panels
 - Omnisite Alarm Monitoring System
- New Rotary Style Blower
- 15 Chainfall Valve Actuators
- SCADA Monitoring system
- River Street Effluent Line
 - Cleaning
 - Televising
 - Lining

2009 & newer structures





2009 Upgrades

Ferrous Chloride Storage Tanks



2009 Upgrades

Ultraviolet Disinfection Process



2009 Upgrades

Sand Filtration Drying Beds



2011 - Present

Subsequent and ongoing
additions

2011/2012 Upgrades

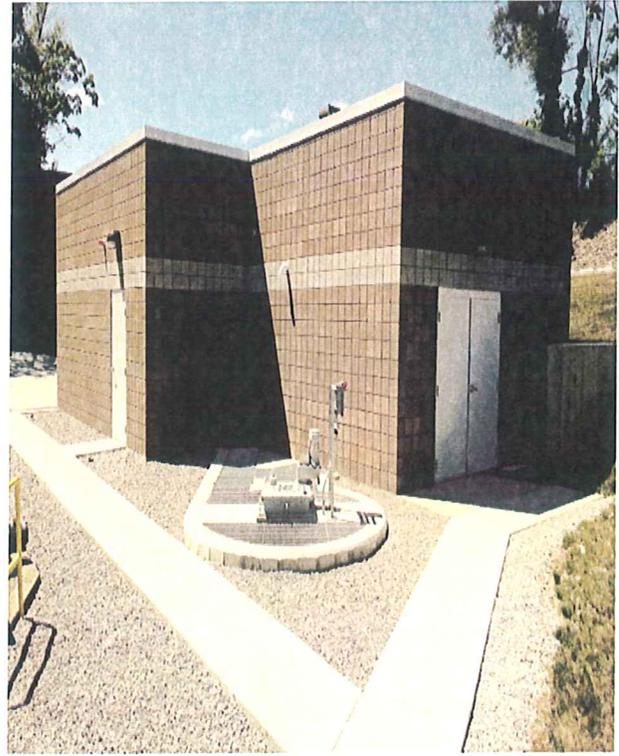


- MCC Panel Cleaning/Rebuild
- Electrical System Redundancy
- Muffin Monster Rebuild
- New Digester Recirc Pump
- New HP Pump & Motor
- 2 New Final Effluent Pumps & Motors
- Lift Station Repairs

2014

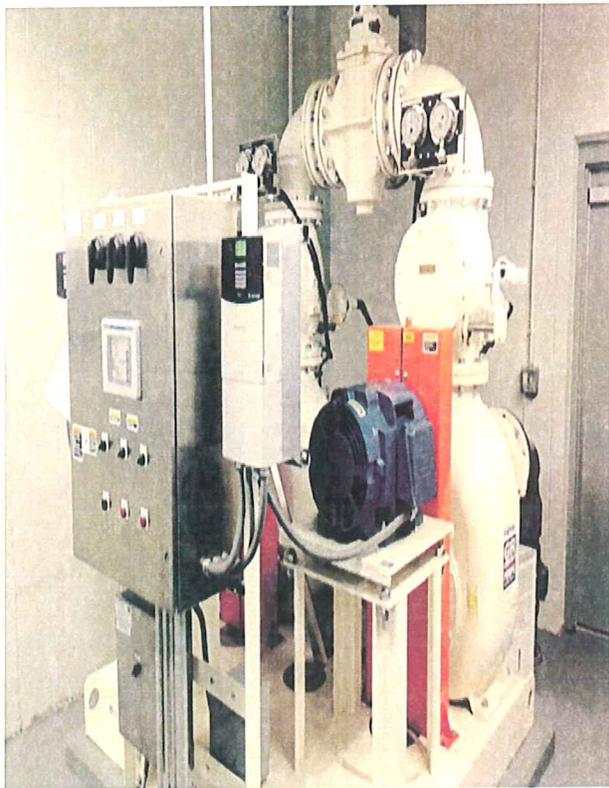
- Headworks
 - Fine Screen
 - Grit Classifier
 - Primary Pumping Station
 - Samplers

2014 - Headworks



2014 - Headworks

Gorman Rupp Pump Station

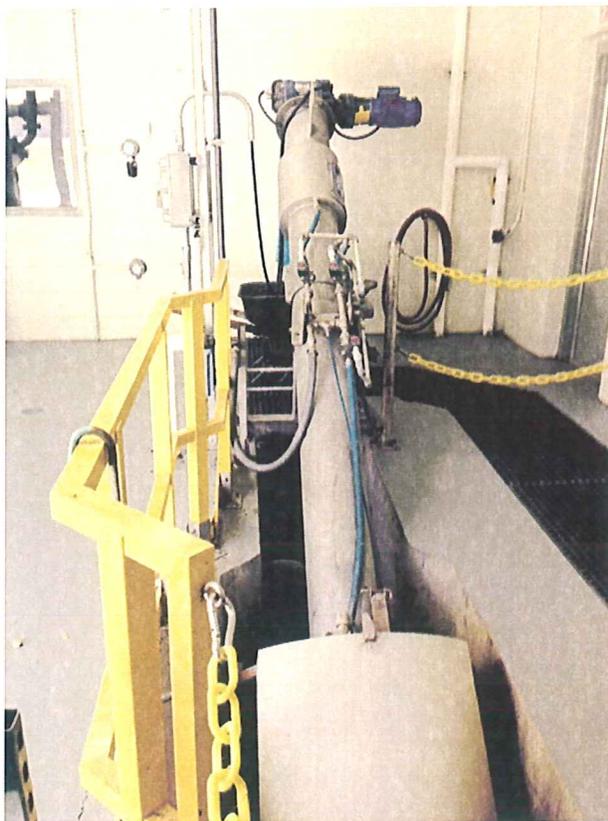


Composite Samplers

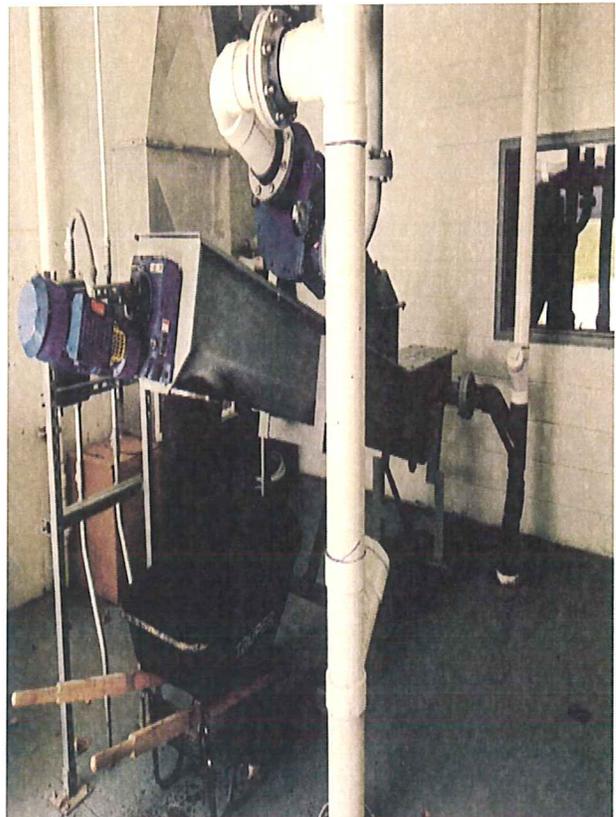


2014 - Headworks

Fine Screen



Grit Classifier





City of Buchanan

Wastewater Treatment Plant Current Conditions

Current Conditions

- As Stated earlier, portions of the current WWTP have been in operation since 1938. After almost 75 years in operation for 24/7/365 these parts of the plant have far exceeded their life expectancy of 50 years. Portions of these components have been patched and repaired in the past but to do so now would not be a wise use of funding.

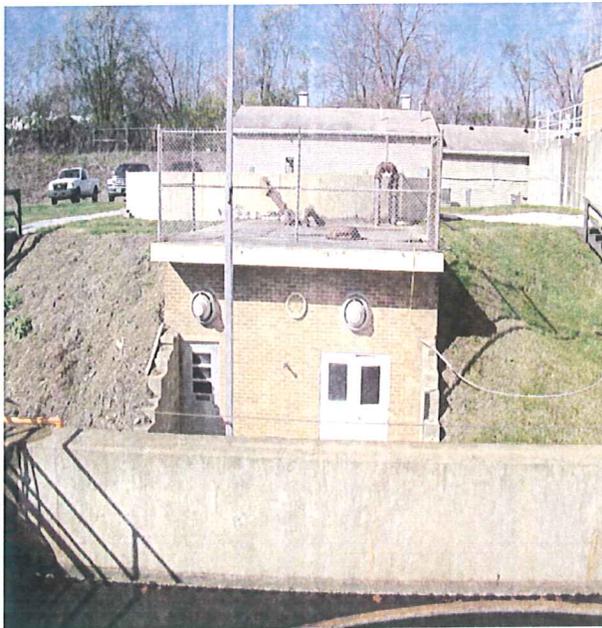
Current Conditions



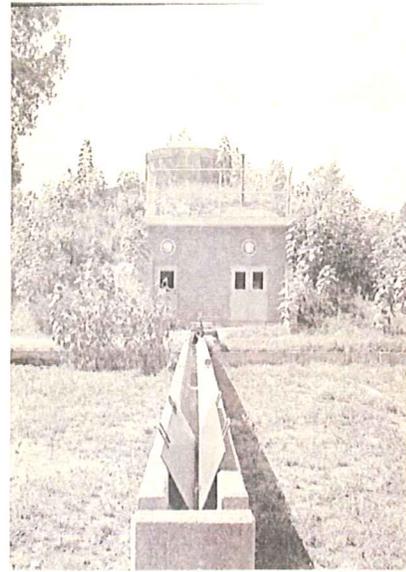
- As of right now, the “newer” portions of the plant are at 80% of their life expectancy for the infrastructure and have surpassed the life expectancy of the mechanical and electrical components by 15 to 20 years.

70+ Years in Operation

“Old” Digester 2012

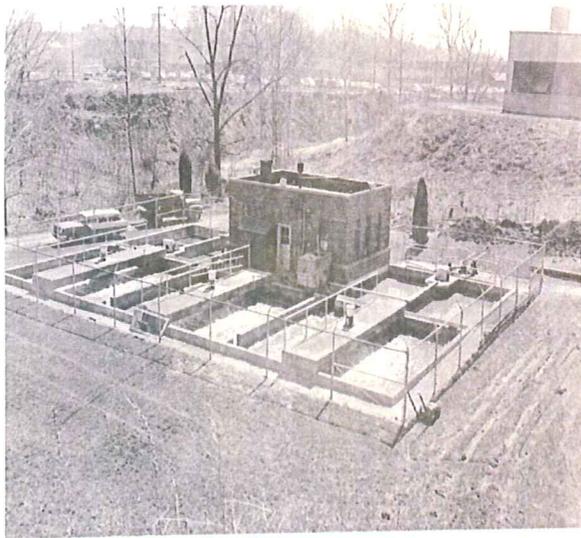


“Old” Digester 1942



70+ years in Operation

Original Plant circa
1940



Old Lab – Present Day



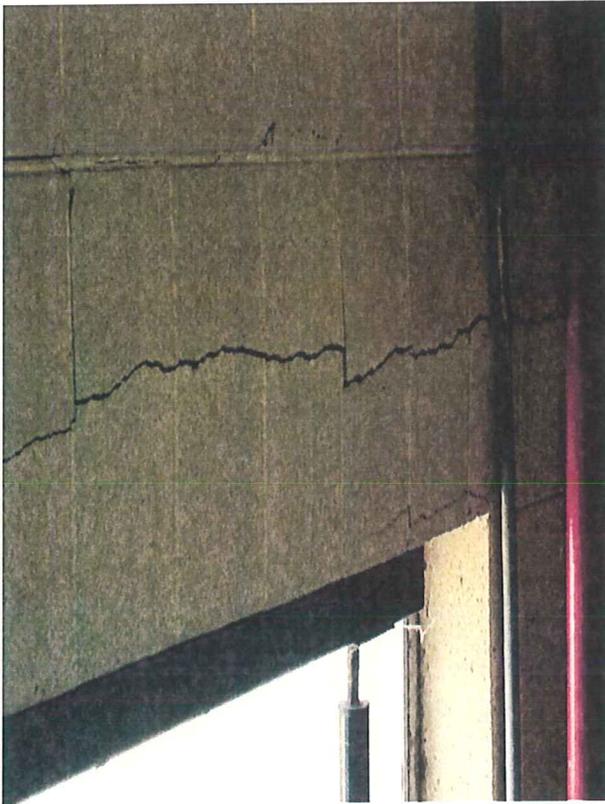


Current Conditions

Areas of Concern

Area of Concern

Digester Building –
Horizontal Crack



Digester Building –
Vertical Crack



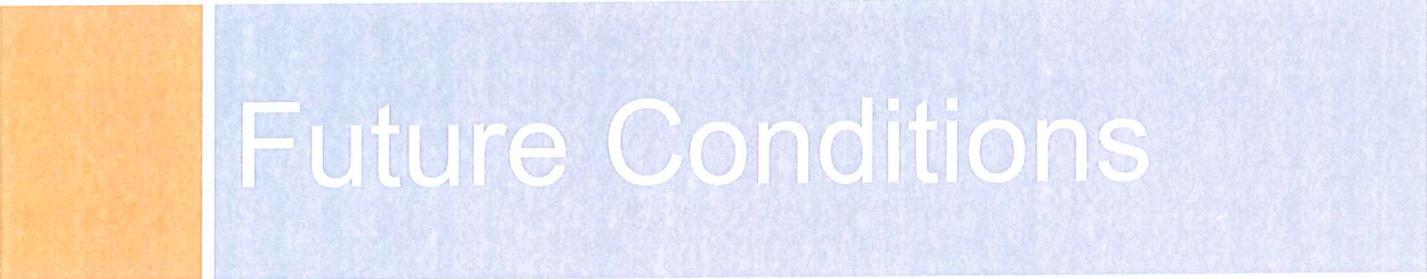
Area of Concern

Old Lab Building



Metal, Mechanical, & Electrical

- Bridges
- Launder Troughs
- Pumps
- Valves
- High Voltage Buses
- Square D MCC Panels



Future Conditions

Structure and Equipment
Lifespans

Structural and Mechanical/Electrical Lifespans

Design Life of Wastewater Systems

Components	Years of Design Life
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