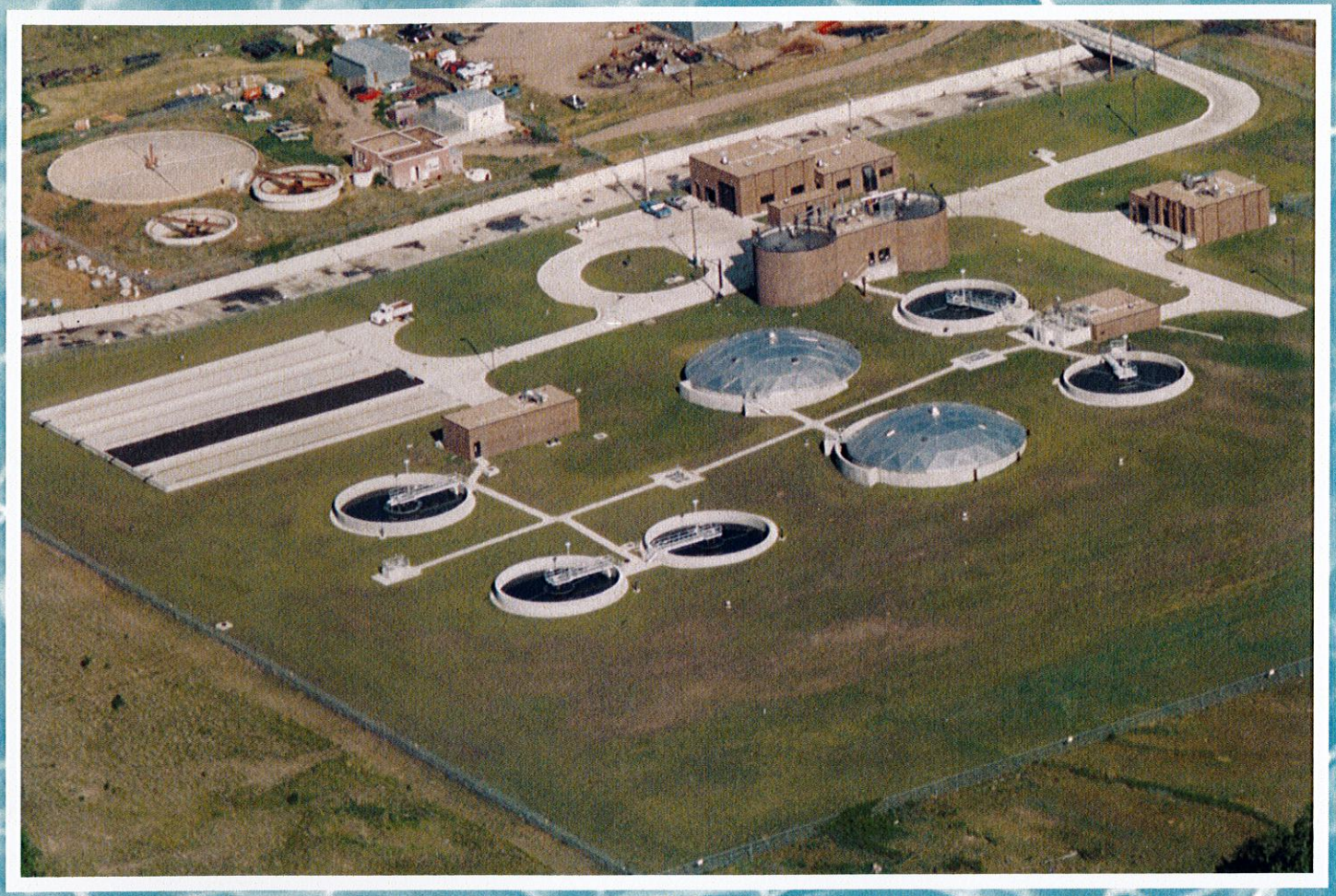
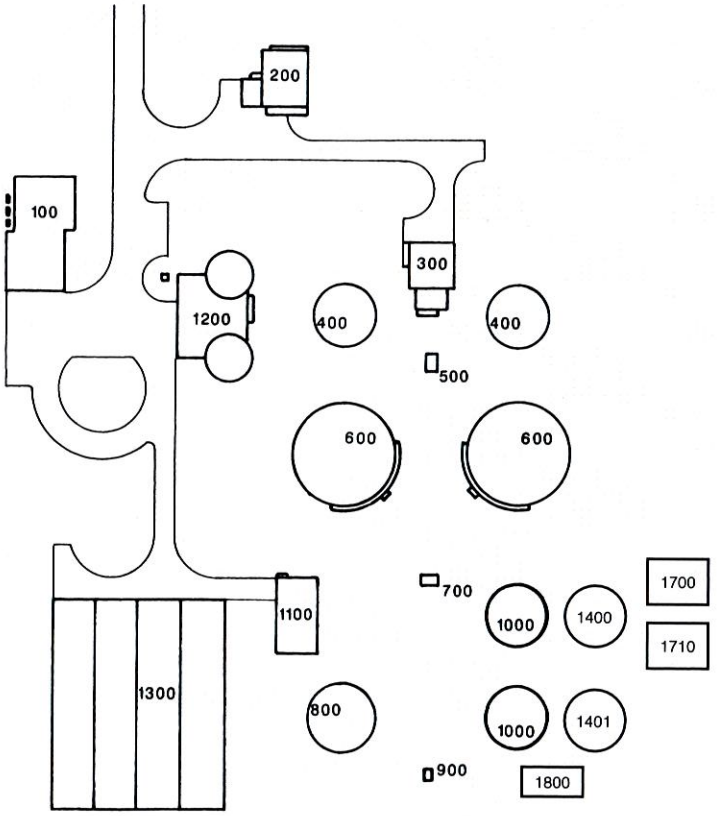
Ogallala



Water Pollution Control Facility

The Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act of 1977 established a comprehensive approach for a program to maintain and enhance the quality of this country's water resources. In 1980, in accordance with the requirements of this act, a study of Ogallala's future wastewater needs was performed. This study recommended that the two existing treatment facilities be abandoned and a new treatment facility be constructed. In addition to the present plant, a pumping station, forcemain, and interceptor sewers were recommended. In 1983, the Nebraska Department of Environmental Control approved the design of the proposed facilities and made a grant offer to the City for funding. This grant included both state and federal dollars. Construction commenced in the summer of 1983 and the plant began operation in the summer of 1985.



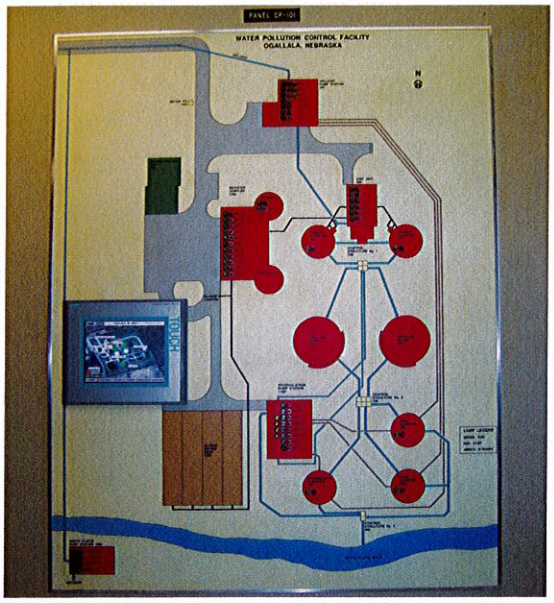
100 Administration Unit
200 Influent Pump Station
300 Grit Unit
400 Primary Clarifiers
500 Control Structure No. 1
600 Trickling Filters
700 Control Structure No. 2
800 Intermediate Clarifier
900 Control Structure No. 3
1000 Final Clarifiers
1100 Recirculation Pump Station
1200 Digester Complex
1300 Sludge Beds
1400 Final Clarifier
1401 Final Clarifier
1700 AS Blower Building
1710 Activated Sledge Basin
1800 Ultraviolet Disinfection

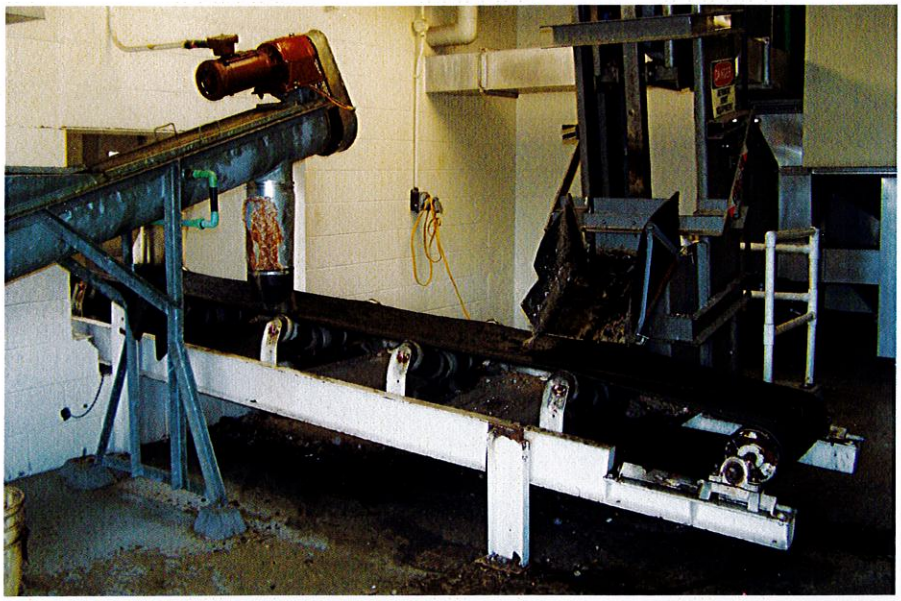
General: The wastewater treated at this facility is the domestic and commercial waste generated by the City of Ogallala. The treatment facility is a two-stage trickling filter plant with anaerobic digestion. Other treatment processes include screening, grit removal, primary clarification, two-stage trickling filtration, intermediate and final clarification, anaerobic sludge digestion, liquid sludge disposal and sludge drying beds.

Design Criteria:

Design Population Equivalent	7,200
Design Flows	
Average Day	1.162 mgd
Peak Month	1.522 mgd
Peak Day	1.917 mgd
Peak Hour	2,905 mgd
Design Loadings	
BOD	180 mg/l
Suspended Solids	200 mg/l

Administration Building: The administration building contains a shop for performing maintenance and repairs, a laboratory for testing purposes, and a control room. The operator can review the condition of the major equipment by observing the status lights on the graphic display. Also, flow recorders and alarm lights are located in the control room to assist the operator. Alarm conditions during the night or on weekends are automatically sent to the operators' phones using text with the SCADA system, via the internet.

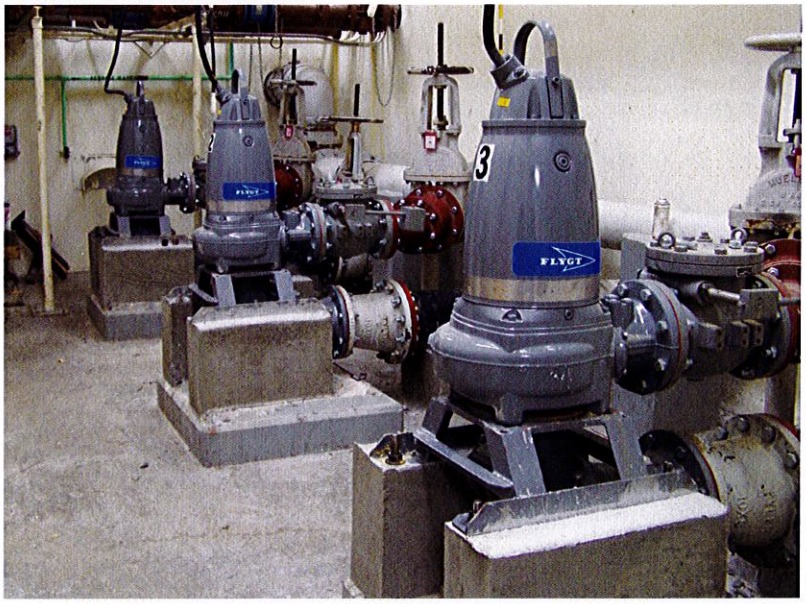




Screening: Before wastewater enters the wet well in the influent pump station, it passes through a mechanically cleaned bar screen which removes rags, sticks and other debris that may interfere with other plant equipment. A manually cleaned bar screen is provided in case the mechanical screen fails. The debris is conveyed to a trash dumpster in the loadout area.

Pumping: Wastewater is pumped from the influent pump station wet well to the grit removal unit. Three influent waste pumps are provided for this purpose.

Grit Removal: Aerated grit removal units remove materials such as pebbles, sand and ash from the wastewater before it flows to the subsequent treatment processes. Grit settled to the bottom of the basin flows back to the influent pump station where the grit washer is located. Washed grit falls onto the screenings conveyor belt.



Primary Clarification: Wastewater from the grit removal unit enters two 45 foot diameter clarifiers where settleable solids are removed from the wastewater. These solids, or sludge, are pumped from the bottom of the clarifiers into the primary digester. The sludge pumps are located in the grit unit. By retaining the wastewater in these clarifiers for approximately three hours, the organic strength of the wastewater is decreased 30 percent.

First Stage Trickling Filter: The first stage trickling filter receives wastewater from the clarifiers and sprays it over filter media (a bed of rocks). A biological growth on the filter media feeds on the pollutants contained in the wastewater, reducing its organic strength. Both trickling filters have dome covers to retain heat and prevent ice formation.

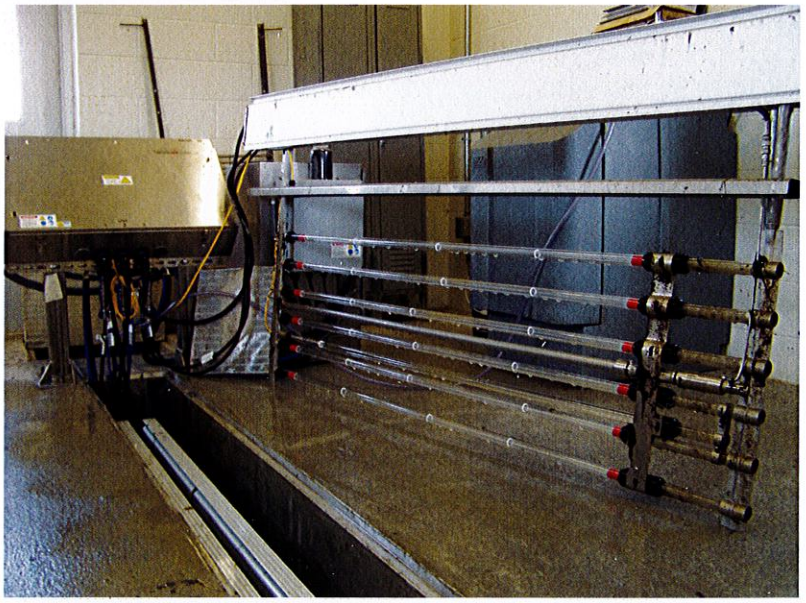
Intermediate Clarifier: This unit removes the biological growth (humus) that sloughs off the trickling filter media before the wastewater continues to the second stage trickling filter.

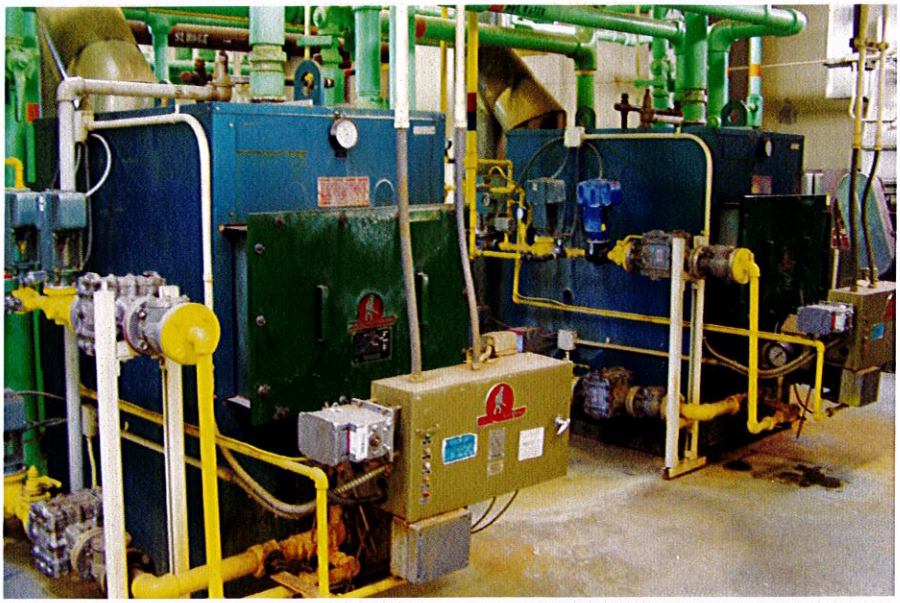
Second Stage Trickling Filter: This unit is identical to the first stage unit, but the loadings are lighter since the wastewater has already passed through the first stage. This unit further treats the wastewater in the same manner as the first stage. Both filter units can operate as single stage units. Under single stage operation, the intermediate clarifier is idle.

Final Clarifiers: The final clarifiers separate solids grown on the second stage trickling filter from the treated wastewater. Treated wastewater, or "effluent," is discharged directly to the South Platte River. Humus removed from the wastewater is returned to the wet well in the influent pump station. Flow control valves on the return lines can be set to return a percentage of the influent flow rate, allowing a constant rate of flow to be applied to the trickling filter system.

Recirculation Pump Station: The recirculation pump station recirculates flow from the intermediate and final clarifiers back to the trickling filters. This recirculation further reduces the pollutants contained in the wastewater.

Ultraviolet Disinfection: After the wastewater has been treated by the other systems, it flows through UV Disinfection. This system is composed of six modules of UV lights that sterilize and reduce the number of harmful micro-organisms to safe levels.





Methane gas produced in the anaerobic digesters can be used as an alternative fuel source. At this facility, it can be burned in either of the heating boilers. The boilers are used for heating the on-site buildings, as well as the sludge. The facility is designed to utilize a minimum of 95 percent of the methane gas produced.

Land Application: After anaerobic digestion, the sludge resembles humus material, which can easily be utilized as a soil conditioner. Sludge drying beds are used in this process. Dried sludge can be spread on agricultural land or taken to the landfill.

Anaerobic Digestion: Solids removed in the primary clarifiers are pumped to the primary anaerobic digester. Here the solids are decomposed in the absence of oxygen. The optimum temperature for digestion is 95° F. These solids are then transferred to the secondary digester where they are allowed to undergo further decomposition. During the decomposing process, methane gas is produced. This gas is stored in the secondary digester.

Laboratory: Analyses are performed in the laboratory to determine if the water pollution control facility is treating the wastewater to the limits required by the State of Nebraska. Other analyses are performed to provide information concerning process efficiency and data to aid the operators in fine tuning the operation of the facility.

South Platte Pump Station: The South Platte Pump Station pumps all the wastewater generated on the south side of the South Platte River to the treatment plant. The wastewater is pumped through an eight inch forcemain placed under the river bed.

Computer Maintenance Management: The Ogallala Water Pollution Control Facility was one of the first facilities in the state to utilize a computer to schedule and record the maintenance of the plant equipment. Laboratory data can also be stored in the computer and is utilized to generate the discharge report that must be sent to the state on a regular basis.

NPDES PERMIT DISCHARGE REQUIREMENTS

NPDES PERMIT NUMBER: NE 0040045

FLOW (mgd)	500,000 GPO
BODs (mg/l)	30
TOTAL SUSPENDED SOLIDS (mg/l)	30
OIL AND GREASE (mg/l)	10
pH	6.0-9.0

City of Ogallala, Nebraska