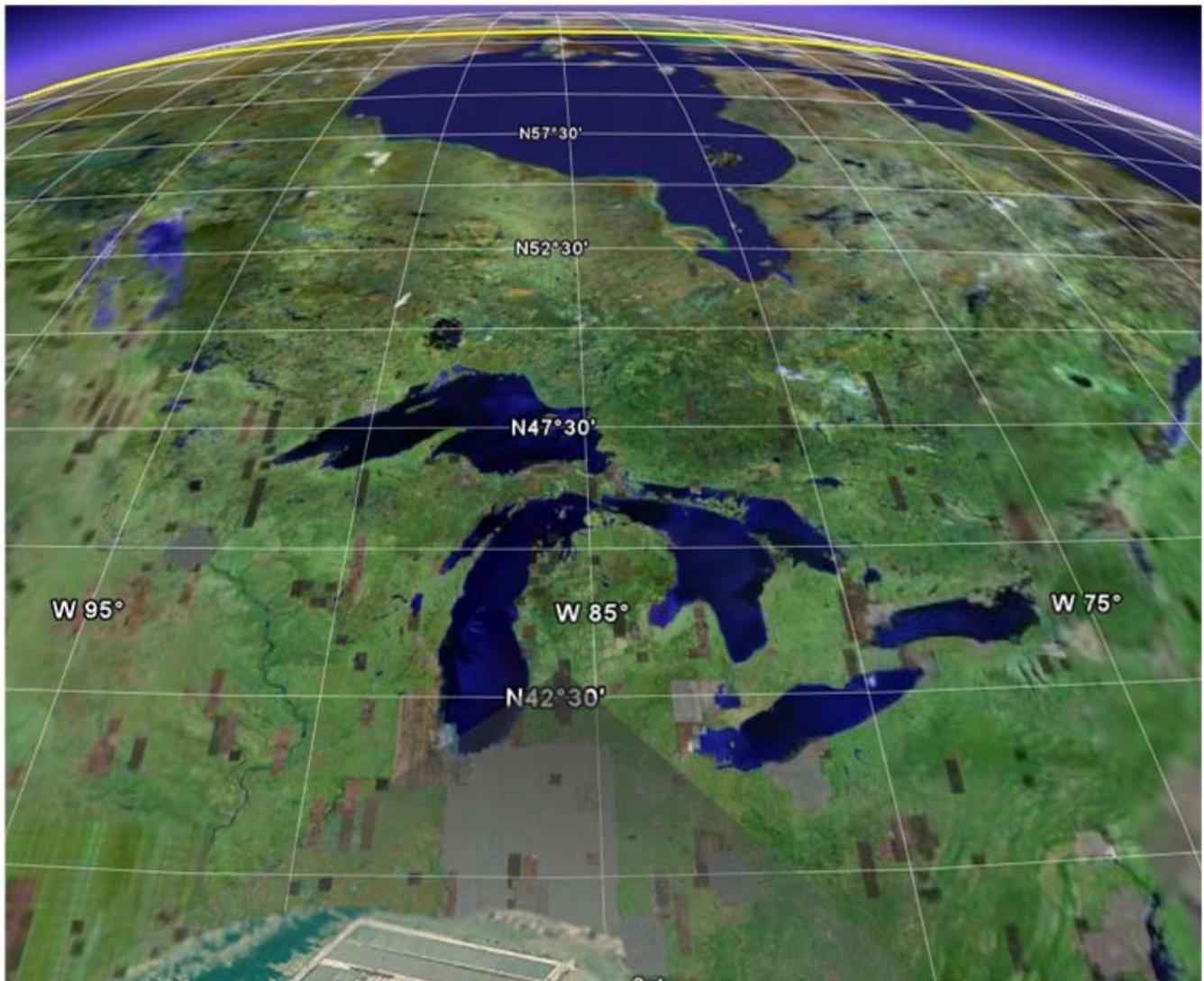


City of Grand Rapids, Michigan
Wastewater Treatment Plant
1300 Market Ave. SW Grand Rapids, Michigan



Introduction

Located in Kent county Michigan, the Grand Rapids Wastewater Treatment plant provides service for 10 communities totaling approximately 265,000 residents within a 125 square mile geographical area. Presently the plant has a design capacity of 61.1 million gallons per day (MGD) with a daily average flow of 51 MGD. The facility was constructed in the 1920's and treatment consisted of primary clarification, anaerobic digestion, and drying beds. The sludge from the drying beds was bagged and sold to businesses and homeowners for fertilizer for many years. In the mid 1950s, the plant was expanded to include secondary treatment capability utilizing activated sludge as the biological treatment process along with increased primary treatment capacity and disinfection. In the 1970s, the facility was again expanded to increase flow capacity and solids handling processes. Solids handling converted from digestion to heat treatment and dewatered sludge was transported to local landfills for disposal. In the early 1990s, the facility implemented a land application program which operated for approximately eight years but was discontinued when the heat treatment process was shutdown in 1998. Presently un-stabilized Biosolids are dewatered and transported to local landfills.



Preliminary Treatment



Bar Screens



Aerated Grit Channels

Preliminary Treatment consists of screening and grit removal. This is accomplished using four bar screen units with $\frac{1}{4}$ " bar spacing. Each bar screen unit is rated for 50 MGD flow rate for a combined capacity of 200 MGD. Screenings are conveyed to a compactor/washer and subsequently deposited into roll off containers. The screenings are disposed of in local landfills.

Following screening, the wastewater travels through aerated grit channels. There are four grit channels, as shown on the previous page, each having a capacity of 50 MGD for a combined capacity of 200 MGD. Plant Operators place bar screens and grit

channels in and out of service depending on plant flow. Presently ferrous chloride is introduced just upstream of the bar screens for phosphorus control. Grit is removed utilizing a chain and bucket mechanism then conveyed to grit washing equipment and finally deposited in roll off containers for landfill disposal.

Primary Treatment

Primary treatment at the Grand Rapids facility is accomplished in 12 primary clarifiers. These clarifiers are rectangular in shape and include flight mechanisms to transport the settled sludge to a sludge hopper. The sludge hopper contains an auger which transfers the sludge to the pump suction for pumping to sludge storage tanks. At the Grand Rapids facility, primary treatment capacity for the South primaries is 21



Primary Clarifiers

MGD. Annual average daily flow is 11.5

MGD. The North plant has a treatment capacity of 106 MGD. Annual average daily flow is 28.25 MGD. The combined treatment capacity of the South and the North facilities is 127 MGD. While the plant has the ability to introduce polymer at the inlet channel to each primary clarifier, no polymers are presently in use.

Secondary Treatment

Secondary treatment is accomplished through complete mix activated sludge. The North plant is comprised of four aeration basins with a combined hydraulic treatment capacity of 48 MGD. Annual average daily flow is 21 MGD. Aeration is accomplished using fine bubble diffusers and five 450 HP multiple stage centrifugal blowers. This arrangement provides for 1 spare blower unit under worst case conditions. This is followed by final clarification in one of four circular clarifiers. Return sludge from the clarifiers is pumped via inclined screw pumps to the head end of the aeration basins where it is mixed with the incoming flows from primary clarification.



Aeration Basin (Fine bubble diffusers)

The South plant utilizes fine bubble diffusers with a selector zone for filament control and has a hydraulic treatment capacity of 52 MGD. Annual average daily flow for is 22.9 MGD. In the South plant three (3) 1000 HP single stage blowers provide process air. This arrangement provides one spare unit under worst case conditions. This is followed by secondary clarification in one of six circular clarifiers. Return sludge from the clarifiers is pumped via six centrifugal pumps to the head end

of the aeration basins where it is mixed with the incoming flows from primary clarification prior to entering the selector zones located at the front end of each aeration basin.

Biosolids Handling

Biosolids collected in the various treatment processes are dewatered utilizing two centrifuges following gravity belt thickening. Dewatered biosolids are then loaded into sealed transport trucks through a network of conveyors and augers. The biosolids are then transported to local landfills. In December 2006 the City of Grand Rapids Biosolids EMS program was certified by the National Biosolids Partnership.

Dewatering & Loading Facilities



Disinfection

Disinfection is accomplished utilizing ultraviolet light. Flow from the North secondary clarifiers enters the North UV building which contains two channels with each channel having two reactor banks. Flow from the South secondary clarifiers enters the South UV building which contains two channels with each channel having two reactor banks. A interconnect channel connects the South and the North secondary clarifier effluent providing for further redundancy in that Operators can direct South plant flows to the North UV reactor building and vice versa if necessary.



UV Disinfection Equipment

Grand Rapids Michigan Wastewater Treatment Plant

