

# The City of Willmar, Minnesota Wastewater Treatment Facility

The Willmar is the Kandiyohi County Seat, and is located approximately 100 miles west of the Twin Cities.

The wastewater treatment facility serves the City of Willmar (population 18,488) and the Eagle Lake Sanitary District (population 961). Developed areas surrounding Eagle Lake, Willmar Lake, and Foot Lake lie inside the service area. The wastewater treatment facility also treats discharges from Jennie-O Turkey Store, approximately 40%, 60% and 30% of the average annual flow, BOD5 loading, TSS loading, respectively originate at the two JOTS locations.

The original plant, constructed in the 1930s, has had many upgrades with the first being in 1960 then 1980, 1988 and 1996.

The existing treatment facility consists of a mechanical bar screen, aerated grit chamber, fine rotary screens, four primary sedimentation clarifiers, roughing/trickling filter followed by 32 rotating biological contactors, two secondary clarifiers and the chlorination unit. Biosolids treatment includes a gravity thickener, two anaerobic primary digesters, two secondary digesters and a 1.9 mg biosolids storage facility.

The system also includes three odor control units. An Earthen Biofilter treats odors from the roughing/trickling filter. As of 2005, the existing collection system included 1,709 manholes and 93.5 miles of ranging in diameter from eight to 38 inches. The city also maintains 16 lift stations within the city service area and nine county-owned stations around Eagle Lake. The wastewater treatment facility discharges its effluent to County Ditch 46, which eventually discharges to the Minnesota River.

The existing plant design summary is as follows:

Design Flow: 5.04 MGD  
Peak Design Flow: 8.64 MGD  
Average BOD5 Loading: 10,800 ppd  
Average TSS Loading: 13,500 ppd



Design Population: 15,900  
Design Equivalent Population: 63,500  
(with industrial load)  
Effluent BOD5 Standard: 25 mg/L  
Effluent TSS Standard: 30 mg/L  
Effluent Fecal Coliform Limit:  
200 per 100 ml

The city has agreed to construct a new treatment facility that will be designed and constructed to be operational in the fall of 2010. The estimated project cost is \$80,000,000.

## THE PROJECT:

The relocation of the 70-year-old WWTP, because of the existing WWTP's

- Inability of the existing treatment process to meet the city's regulatory requirements.
- Continued aging of the outdated (failed) treatment technology.
- Continued city growth resulting in increase flows and loadings.
- Upcoming regulatory changes in

water quality associated with the Minnesota River.

The new plant proposed plant design summary is as follows:

Designed Flow: 5.24 mgd  
Peak Design Flow: 27.36 mgd  
Average BOD5 Loading: 14,679 ppd  
Average TSS Loading: 9621 ppd  
Average TKN Loading: 2548 ppd  
Average TP Loading: 567 ppd  
Effluent BOD5 Standard: 15 mg/L  
Effluent TSS Standard: 30 mg/L  
Effluent NH3 (Dec-Mar): 5 mg/L  
Average TP Standard: 1 mg/L  
Effluent Fecal Coliform Limit:  
200 per 100 ml

The new wastewater treatment facility will have water quality benefits of less phosphorus, less nitrogen, less ammonia, less oxygen demand and no chlorine. The new design is anticipated to be serviced by the end of the facilities planning period (year 2030). CS