

Municipal Engineering

MADISON LAKE REGIONAL FORCEMAIN

**2010 CITY ENGINEERS ASSOCIATION OF MINNESOTA
AWARD-WINNING PROJECT**

Due to aging of facilities and changing discharge requirements, the City of Madison Lake wastewater treatment facility (WWTF) was in need of major upgrades or replacement. The cost for these improvements, though, was significant for the City. Therefore, alternative options were considered, and the Council ultimately decided to regionalize with the City of Mankato for wastewater treatment. This decision required the design of nearly five miles of forcemain, a regional lift station, modifications to existing infrastructure, and the decommissioning of the existing WWTF.

REGIONAL PLANNING

There are several concentrated areas of rural development around three lakes adjacent to the City of Madison Lake. Over the past several decades, there

had been discussions regarding the potential for regionalized or clustered treatment for these homes in place of existing individual sewage treatment systems, some of which were failing. When Madison Lake decided to regionalize with the City of Mankato, the alternative of a more regional collection system was developed. Throughout the entire predesign process, efforts were made to coordinate with the rural areas, resulting ultimately in the oversizing of the forcemain and lift station for future use by these rural areas. This solution provided cost savings for all parties.

PROJECT DESIGN

While not complex in design, the implementation of the project took considerable ingenuity and effort. The route of the regional forcemain, along Blue Earth County State Aid Highway 26, included numerous wetlands and lakes. To eliminate impacts to these sensitive areas, directional boring was utilized for a significant portion of the project.

The City of Madison Lake has a series of sanitary lift stations in their wastewater collection system. Through strategic location of the regional lift station, it was possible to reroute a large portion of the existing sewer system directly to the regional lift station via





gravity, instead of through a series of two additional lift stations. In addition to reducing operational costs of those lift stations, an upgrade to an existing forcemain was avoided, resulting in over \$100,000 of savings.

The project consisted of nearly five miles of 12-inch diameter forcemain, a regional sanitary lift station, local gravity sewer and forcemain modifications, and the decommissioning of the existing WWTF. The forcemain, as described earlier, was oversized for future use by the rural lakes areas. This 12-inch forcemain was constructed of High Density Polyethylene (HDPE) pipe. This durable material has additional desirable qualities such as a smooth interior, the ability to be directional bored, and gasketless connections through heat fusion.

The City of Mankato owns and operates the new lift station. Due to the critical nature of the lift station, a gas-fired backup generator was provided on site. The controls of the lift station were designed to communicate with the existing City of Mankato centralized control system, allowing the City to monitor the lift station status from Mankato.

To reroute wastewater from the existing WWTF to the new regional lift station, a new 6-inch forcemain was constructed from an existing lift station to the new regional lift station. Additionally, gravity sewer modifications were made to directly discharge approximately one half of the existing flow directly into the regional lift station, reducing demand and operating costs on two downstream lift stations.

The existing Madison Lake WWTF consisted of an activated sludge process with an oxidation ditch, clarifiers, gravity filtration, and chlorination. The decommissioning of the facility was accomplished through the transfer of the majority of the untreated influent back to the regional lift station for treatment and the disposal of the remaining solids. Salvageable materials were removed from the plant, and the existing building, oxidation ditch, and clarifiers were demolished.

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