FIRST OF ITS KIND WATER RESOURCE & RECOVERY FACILITY

By Maria Effertz-Hanson, AE2S Communications

The City of Watford City is home to a first-of-its-kind facility in North Dakota, which represents progress and planning for the future in the oil-rich Bakken region. The Watford City Water Resource Recovery Facility (WRRF) has been fully operational since November 2016.

Rebar and forms for the Return Activated Sludge (RAS) splitter structure at the Watford City WRRF.

Watford City is the smallest community in North Dakota to utilize staged anaerobic/anoxic/aerobic treatment via micro-organisms to turn wastewater into irrigation water and reduce the amount of nutrients in the effluent discharged to Cherry Creek. It is also the first WRRF in North Dakota to have a continuous discharge permit to an ephemeral stream. The permit was issued by the North Dakota Health Department because of the Agency's confidence in the technology and processes of this type of system, as well as the quality of water that is being released. Additionally, this was the first facility in North Dakota to use the Construction Manager at Risk project delivery methods as opposed to the traditional design-bid-build project delivery method.

The treatment process begins with flow measurement and moves through unit processes including fine screening, grit removal, extended air oxidation ditch treatment, final clarification, disinfection, effluent aeration, and effluent pumping. During the process, billions of micro-organisms in the facility digest, consume, and decompose a majority of the organic material present in the wastewater, as well as remove phosphorus and nitrogen.

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The initial sludge "seed" containing micro-organisms was brought in from the City of Williston's WRRF, but the micro-organisms at the Watford City WRRF are now reproducing on a regular basis and thriving in the treatment environment. The detention time through the process is about 72 hours, which is nearly 60 times faster than a traditional lagoon or pond system.

After the organisms break down the organics, the water is filtered and clarified and a small amount of chlorine is added for disinfection. The treated water is released into nearby Cherry Creek or stored in holding ponds which can be utilized for irrigation at the public golf course. The WRRF has consistently produced effluent with BOD and TSS less than 5 mg/L, total phosphorus less than 1 mg/L, and total nitrogen less than 8 mg/L.

Aluminum geodesic domes cover two 70-foot diameter final clarifiers at the Watford City WRRF.

The biosolids, nutrient-rich organic materials resulting from the treatment, are stored in aeration lagoons and further stabilized until they are ultimately land-applied.

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The facility serves a population of 7,000. However, it is designed to serve 15,000 people with an average daily flow of 1.6 million gallons per day (MGD). For more information about the Watford City WRRF project, contact Jayme Klecker, AE2S Project Manager, at Jayme.Klecker@ae2s.com.

Jayme Klecker, AE2S Project Manager, talks with Matt Beard, Watford City Council Member, inside the clarifier at the Water Resource Recovery Facility