Expanded Bacteria and Total Suspended Solids Wasteload Allocations Justification for the Windom Wastewater Treatment Facility NPDES/SDS Permit (MN0022217) – February 26, 2018

Amendment to the West Fork Des Moines River Watershed Multiple Impairments TMDL - approved by EPA on December 18, 2008

The Windom Wastewater Treatment Facility (WWTF) is a continuous discharging mechanical system that has an average wet weather design flow (AWWDF) of 1.83 million gallons per day (mgd) and includes one discharge monitoring point (SD002) that discharges to the West Fork Des Moines River. The permitted fecal coliform limit at SD002 is 200 organisms per 100ml (April through October). The permitted total suspended solids (TSS) limit at SD002 is 30 mg/L.

The City of Windom is proposing to construct at the Windom WWTF, adding new components to the mechanical system and increasing the AWWDF from 1.83 mgd to 1.93 mgd. This proposed expansion will require an expansion to the wasteload allocations (WLAs) for both bacteria and TSS in the West Fork Des Moines River Watershed Multiple Impairments TMDL.

On December 18, 2008, the West Fork Des Moines River Watershed Multiple Impairments TMDL was approved by the U.S. Environmental Protection Agency (EPA). For WWTFs, the WLAs were calculated by multiplying AWWDF for continuously discharging WWTFs, or the maximum permitted discharge rate for controlled discharge pond facilities by the 126 organisms per 100 ml water quality standard. Windom's WWTF fecal coliform effluent limit is intended to ensure complete effluent disinfection; therefore, as long as the Windom's WWTF discharge is at or below this permit limit, the discharge will not contribute to violations of the water quality standard regardless of their fecal coliform load.

An analysis of the effects of expanded WLAs, prepared by Tetra Tech for the Zumbro River Turbidity Total Maximum Daily Load (TMDL) (Cleland 2011), demonstrates that current discharges can be expanded and new NPDES discharges can be added while maintaining water quality standards; provided the permitted NPDES/SDS effluent concentrations remain at or below the in-stream concentration targets.

Fecal coliform/E. coli

The West Fork Des Moines River Watershed Multiple Impairments TMDL used an AWWDF of 1.83 mgd to set the WLA at 14 billion organisms per day (b-org/day). The calculation for the proposed expansion will use an AWWDF of 1.93 mgd. This is a difference of 0.10 mgd. Using the AWWDF of 1.93 mgd, the WLA would be 14.61 b-org/day.

1.83 mgd = 2.8314 cubic feet per second (cfs)
1.93 mgd = 2.9861 cfs
2.9861 cfs – 2.8314 cfs = 0.1547 cfs

This NPDES/SDS Permit authorizes the expansion of the WLA for the WWTF. Expansion of the WLA will not contribute to the E. coli impairment in the Des Moines River because the NPDES/SDS Permit's fecal coliform permitted discharge limit of 200 organisms per 100 ml is consistent with the water quality standard.

As mentioned above, the difference between the design flows is 0.10 mgd, which is equal to 0.1547 cfs. This means an increase of 0.1547 cfs of flow from the Windom WWTF to the Des Moines River, which in turn expands the E. coli loading capacity by 0.61 b-org/day. The discharge will not result in a decrease in the Des Moines River's water quality because fecal coliform bacteria loading capacity will increase as a result of the increased stream flow resulting from the discharge.

	Approved wasteload allocation	**Flow increase**	**E. coli load increase**	**Modified wasteload allocation**
Windom WWTF WLA expansion	14 b-org/day	0.1547 cfs	0.61 b-org/day	14.61 b-org/day
Des Moines River (AUID 07100001) loading capacity expansion		0.1547 cfs	0.61 b-org/day	

Total Suspended Solids

The West Fork Des Moines River Watershed Multiple Impairments TMDL used an AWWDF of 1.83 mgd to set the WLA at 208 kilograms per day (kg/day). The calculation for the proposed expansion will use an AWWDF of 1.93 mgd. This is a difference of 0.10 mgd. Using the AWWDF of 1.93 mgd, the WLA would be 219.15.
Conversion: 30 mg/L X 1.93 mgd X 3.785 = 219.15 kg/day

1.83 mgd = 2.8314 cubic feet per second (cfs)
1.93 mgd = 2.9861 cfs
2.9861 cfs – 2.8314 cfs = 0.1547 cfs

This NPDES/SDS Permit authorizes the expansion of the WLA for the WWTF. Expansion of the WLA will not contribute to the TSS impairments in the Des Moines River – Headwaters Watershed because the NPDES/SDS Permit's 30 mg/L TSS discharge limit will ensure that the discharge does not have reasonable potential to cause or contribute to an exceedance of the applicable 65 mg/L TSS water quality standard.

As mentioned above, the difference between the design flows is 0.10 mgd, which is equal to 0.1547 cfs. This means an increase of 0.1547 cfs of flow from the Windom WWTF to the Des Moines River, which in turn expands the TSS loading capacity by 11.15 kg/day. The discharge will not result in a decrease in the Des Moines River's water quality because TSS loading capacity will increase as a result of the increased stream flow resulting from the discharge.

	Approved wasteload allocation	**Flow increase**	**TSS loading capacity increase**	**Modified wasteload allocation**
Windom WWTF's WLA addition	208 kg/day	0.1547 cfs	11.15 kg/day	219.15 kg/day
Des Moines River loading capacity expansion		0.1547 cfs	11.15 kg/day	