

Drew Road Water Treatment Plant Profile

Supply Water and History

Drew Road Water Treatment Plant receives its groundwater from three separate wells that have elevated levels of iron and manganese. The levels have historically been above the aesthetic recommend limits of 0.3 mg/L for iron and 0.05 mg/L for manganese. This has caused precipitates to form and during high flow situations dislodge within the water distribution system resulting in “brown water” complaints from customers. EPCOR Water West acquired this water system in May 2006 and began pilot testing to determine the best possible means of dealing with this aesthetic water issue. After pilot testing a membrane filtration system, a more conventional manganese greensand filtration system was selected for iron and manganese removal.



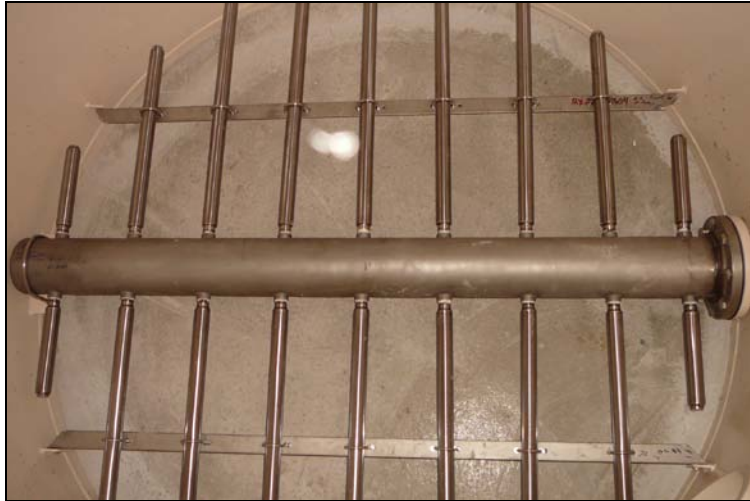
Drew Road Water Treatment Plant

Water Treatment Process

A manganese greensand filtration plant was designed and constructed next to the existing pumphouse to minimize the footprint on the reservoir site. Raw water well supply lines were altered to direct the flow into the new water treatment plant and to enable a complete plant bypass in the event of an emergency.

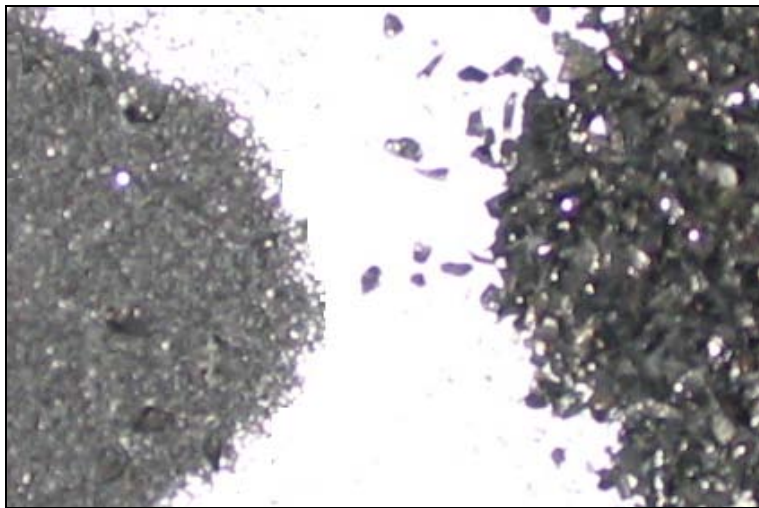
Raw well water enters the treatment plant from different well supply mains and joins into a common header prior to oxidation with sodium hypochlorite. After chemical injection, the well water passes through an inline static mixer which thoroughly mixes chlorine into the well water. At this point, oxidation of iron and manganese begins.

The oxidized well water then flows in parallel into one of three manganese greensand filters, each consisting of a 12 inch layer of anthracite on top of 30 inches of Greensand Plus, a synthetic greensand made of silica sand coated with manganese dioxide. The under drain system consists of 13 inches of gravel type rock.



Picture of under drain system

Iron precipitate forms more rapidly than the manganese precipitate and begins filtration in the top layer of anthracite, while the manganese is absorbed onto the synthetic greensand.



Greensand on the left and anthracite on the right

In the figure below, water flows downward into the filter through the top right inlet valve and passes through the filter media. It leaves the filter through the bottom right outlet valve. Backwashing is done by closing both the inlet and outlet valves and reversing the flow upward through the backwash supply and backwash waste valves. After a backwash is over, the filter rinse valve opens up for a set length of time.



Greensand Filter

Filtered water is measured for turbidity and chlorine residual prior to metering. A desired free chlorine residual of 0.5 mg/L is maintained after filtration to continuously regenerate the greensand media. After the treated water leaves the treatment plant it receives secondary disinfection with sodium hypochlorite prior to entering the water reservoirs.

Filter Backwashing

Once a specific head loss is achieved in the filters, a backwash cycle is automatically initiated, using disinfected treated water to dislodge any precipitate material from the greensand and anthracite in the filters. The backwash water is pumped into a holding tank where it is held for discharge into the sanitary sewer during low flow conditions.

Treatment Plant

The water treatment plant is certified by the Environmental Operators Certification Program as a Class III water treatment plant. It is a fully automated treatment system that can be operated manually in the event of an emergency. It was designed for future expansion and there is piping and room in the facility for one more filter to be added with minimal effort. The treatment plant was commissioned in June 2008 and has performed exceptionally well, resulting in treated iron and manganese levels routinely under detection limits.

Plant Parameters:

	ML/day	LPS
Design Capacity	1.8	21
Future Capacity	2.4	28
Average Flow 2008	1.0	11
Peak Flow 2008	1.5	17

Water Quality	Raw Water	Treated Water	CDWG Standard*
Turbidity NTU	0.5	0.2	1.00
Iron mg/L	0.35	<0.05	•0.3 AO
Manganese mg/L	0.17	0.008	•0.05 AO

* Maximum allowed under Canadian Drinking Water Guidelines

ML/day = mega litres per day

LPS = litres per second

NTU = Nephelometric Turbidity unit

mg/L = milligrams per litre

AO = Aesthetic Objective (secondary CDWG)

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