



A 96-inch pipe drains a 367-acre watershed in northeast St. Cloud directly into the Mississippi River, source of the municipal drinking water supply. Before a \$1.3 million stormwater treatment system was installed, that water was untreated. **Below:** Lisa Vollbrecht, assistant public utilities director, explains how the intake station works in St. Cloud. **Photo Credits:** BWSR

St. Cloud's \$1.3M stormwater project affects city's drinking water supply



Every time it rained, untreated stormwater drained from heavily industrial northeast St. Cloud, poured directly into the Mississippi River through a 96-inch pipe, and left a long brown plume visible to the naked eye.

A \$1.3 million Minnesota Board of Water and Soil Resources and Minnesota Pollution Control Agency funded stormwater treatment project completed in fall 2016 is keeping an estimated 67.8 tons of total suspended sediment and 23.7 pounds of total phosphorous out of the river.



Before a stormwater treatment project reduced the amount of sediment entering the Mississippi River, a brown plume appeared after heavy rains.
Photo Credit: City of St. Cloud

“We look a lot of the stormwater treatment as source-water protection. Any stormwater that enters the river – and, ultimately, it does; it doesn’t always have to have a direct pipe – any stormwater that gets into the river is source-water protection for us.”

– Lisa Vollbrecht, St. Cloud
assistant public utilities director

That one pipe drains 367-acre watershed. There’s an even greater value to this project -- one that made it a higher priority for Clean Water Fund dollars.

“The outlet drains into the backwater on the river where the city gets its water from. The water intake is a little bit up from the outlet, but it’s within proximity to be a concern,” Weinerman said.

St. Cloud is one of only three Minnesota cities that draws its drinking water from the Mississippi. (The other two are St. Paul and Minneapolis.) In St. Cloud, Assistant Public Utilities Director Lisa Vollbrecht is responsible for the municipal drinking water and stormwater.

“That’s really our goal is that the surface water that we take drinking water from is a cleaner resource. It’s good for the environment. It’s good for the 70,000 people that drink it. Typically we’ve always looked at ‘swimmable’ and ‘fishable.’ We thought we should really add ‘drinkable’ to that,” Vollbrecht said.

During a short tour of St. Cloud’s intake station, Vollbrecht stepped onto a catwalk that juts over the Mississippi. Underneath the building, pumps drew water from the river. Underneath our feet, a grate filtered out floating twigs and other debris.

Across the Mississippi and underneath Fourth Street Northeast, the stormwater treatment system collects and filters runoff from 45 acres.

“Northeast St. Cloud is a very industrial, developed neighborhood. This is all retrofit stuff. You don’t have any area to treat the runoff. This project helped them treat a good portion of that area and trap a



Workers installed an underground stormwater treatment system in northeast St. Cloud, where untreated stormwater previously drained into the Mississippi River. A \$705,000 Clean Water Fund grant from the Minnesota Board of Water and Soil Resources helped pay for the system. **Below:** A sump manhole, showed during cleaning, acts as a mini treatment system. **Photo Credits:** Benton SWCD

bunch of the sediment and create a constructed settling system underground to help trap that and regularly remove it from the system,” Weinerman said.

The \$430,000 stormwater treatment system acts like an underground series of settling ponds, with three rows of corrugated metal pipes 11 feet in diameter plus sediment-trapping baffles and weirs. Its capacity is 1.13 acre-feet; about 40 percent of that space consists of a permanent pool. Maintaining a 4-foot water depth in each pipe lets solids fall to the bottom.

It’s one of three elements paid for with a \$705,000 Clean Water Fund grant Benton Soil & Water Conservation District received in 2015 through BWSR; the city provided a \$176,250 match. (Northeast St. Cloud lies within Benton County.)



Annually, the three elements of the BWSR-funded project – the treatment system, sump manholes and a vacuum street sweeper – are projected to keep 9.4 tons of total suspended solids and 23.7 pounds of total phosphorous out of the Mississippi River.

Four sump manholes were installed in spots where regular manholes were prone to damage or clogging. Now, where rainwater flows through underground pipes to a sump manhole, baffles filter debris and trap sediment inside the sump.

“It holds any floating debris. We’ll get pop cans – you’d be shocked what is on the street that can get into the system. Because we’ve made it hit this baffle, a lot of the sediment falls out,” Vollbrecht said, illustrating with a sketch. “The stormwater continues on. It just forces this little mini treatment system.”

A regenerative air street sweeper, AKA vacuum sweeper, removes sediment before the rain washes it into the storm sewer.

“The purpose of a vacuum sweeper is it can pick up all of that dust,” Vollbrecht said. “They are much more effective at summer street sweeping and/or industrial areas that don’t have a lot of trees.”

Tracking GIS data and volume of debris collected allows the city to fine-tune sweepers’ routes and frequency throughout the 367-acre watershed.

Related MPCA-funded projects – paving a downtown parking lot and incorporating a raingarden, and installing grass right-of-way strips built with water-retaining depressions – total \$400,000 (including a 50 percent city match). They, too, will hold back rainwater and allow sediment to settle out.

“The thing about sediment is it doesn’t go away. It’s a physical pollutant. It’s hard from a fisheries standpoint because sediment will lay on the bottom of a fishery. You also don’t know what’s in sediment all the time,” Vollbrecht said. “You can correlate sediment with phosphorous, with other pollutants. If you can take those things you can physically see out of the equation, you can relate that back to phosphorus, to other pollutants.”

“The drain pipe affects the water intake of the city, which is important – really important.”

Jason Weirnerman, BWSR Board Conservationist



Photo Credit: Benton SWCD



A vacuum-style street sweeper removes fine particles before they enter the stormwater system in northeast St. Cloud.

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Website: www.bwsr.state.mn.us.