

SAGINAW TOWNSHIP PROJECT-AT-A-GLANCE

Duperon increases plant resilience with bar screen that adapts to changing flow conditions.

SITE: *Saginaw Charter Township Wastewater Treatment Plant*

EQUIPMENT: *One (1) FlexRake IQ²™*

INSTALLED: *August 2020*



A NEW LEVEL OF ADAPTABILITY

Faced with an increase in extreme weather events, together with an increase in non-treatable solids such as “flushable” wipes, wastewater treatment plants are under pressure to improve the resilience of their operations. As influent flows rise and fall, removing debris from headworks to prevent negative downstream effects can be especially challenging. To meet that challenge, the Saginaw (MI) Charter Township Wastewater Treatment Plant (WWTP) turned to an innovative screening solution that offers a new level of adaptability to changing wastewater conditions.

THE CHALLENGE

The Saginaw Charter Township WWTP has two headworks, one with two influent pipes of 21 and 36 inches, respectively; and another that serves the neighboring community of Thomas Township. The flows are combined prior to going through grit removal, primary treatment, oxidation and clarification. The system handles storm water runoff as well as sewage, resulting in dramatic increases in flows during periods of wet weather.

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“Our facility has a design flow of 4.65 million gallons per day (MGD). But when we have rain together with melting snow, we can peak at 20 MGD,” explains Saginaw Township Treatment Coordinator Tim Shepherd, noting that the storm system also brings lots of debris to the plant. “It’s amazing what finds its way into that stream. Everything from large chunks of wood and building materials to dead animals to trash and leaves.” This is in addition to the typical debris in the sanitary waste stream, including rags and grease.

THE SOLUTION

To handle debris removal, the plant installed a Duperon FlexRake bar screen in 2002 with ½-inch openings at the headworks serving Thomas Township. In 2004, a 1-inch FlexRake was installed at the main headworks. This unit replaced an aging screen that required staff to manually rake debris off it three times a day. In 2008, a second FlexRake was added to each headworks to provide screening redundancy.

In 2020, the Saginaw Charter Township WWTP was offered the opportunity to acquire an upgrade: a Duperon FlexRake IQ²™ that had been used for a pilot program in a nearby city. It features a new design that can adapt to ever changing flow conditions.

Under normal operation, the unit has a ¼-inch openings for increased debris removal. During periods of high flow, the unit automatically adapts to the increased screen removal requirements by increasing the speed of the raking system first. If speed alone does not satisfy the high flow conditions, the screen has the ability to then change the size of the openings to ¾-inch, handling up to 40% more flow. This increases hydraulic capacity during peak events to avoid bypassing the screens that would conventionally allow unscreened debris downstream, creating maintenance headaches within the plant.

The FlexRake IQ²™ was installed at the main headworks in 2020, replacing the 1-inch FlexRake installed in 2004. Use of the new bar screen is alternated with the previously installed bar screen to keep both active. "But mostly we try to run the fine screen," Shepherd notes.


THE RESULTS

Once the FlexRake IQ²™ was in operation, it didn't take long for plant operators to see the impact.

"It was amazing how much more solids and grit it removed, which really helps out with everything downstream," Shepherd says, noting that a fine grit accumulates in the rags and other debris and this is removed effectively by the FlexRake IQ²™. "This has really reduced the stress on the plant's grit system."

Shepherd notes that the screen has removed roughly three times the amount of debris before it gets to the grit system. "Previously, we had to empty the grit dumpster three times a week. With the new screen, we empty it just once a week." Removing this abrasive grit early in the process reduces wear and tear on pumps and avoids other downstream headaches, such as grit collecting in the digesters, which can reduce their capacity, Shepherd notes.

The higher level of effective debris removal—including both large objects and smaller debris, such as leaves—does require more frequent emptying of the collection box at the headworks. But Shepherd says this is a worthwhile trade-off, given the dramatic reduction in downstream debris.

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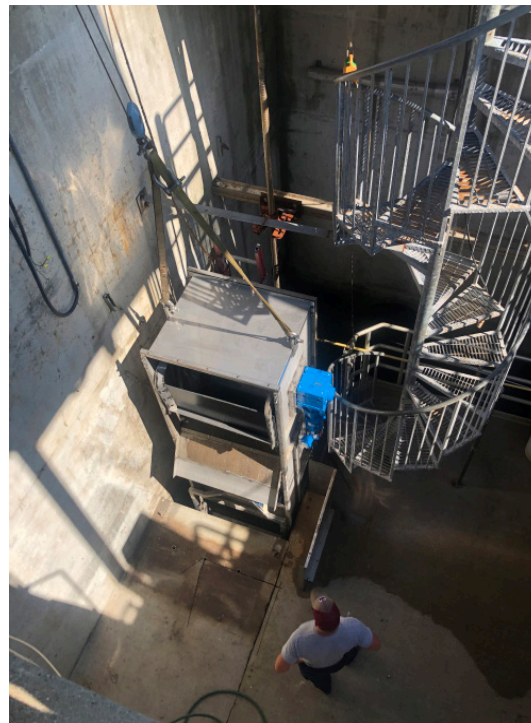
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Shepherd says the FlexRake IQ²™ has also lived up to its promise of adaptability to varying flow levels. "It's been very reactive to the flows. There haven't been any backups or slowdowns in the wet well," he says. "We haven't had any issues with flow restriction."

What's the biggest surprise for Shepherd? "I never realized how much grit was passing through. I never expected grit to be removed by the bar screen," he says, noting this has reduced the amount of grit passing downstream to clarifiers and digesters. "Pumping sludge has been so much easier."

Based on this early experience, Shepherd says Saginaw Charter Township WWTP is now considering acquiring a second FlexRake IQ²™ for the headworks serving Thomas Township to maximize the plant's resilience.

"The bar screen removes debris as efficiently at 20 MGD as it does at 4 MGD," Shepherd says. "That's something other equipment has not been able to do."



ABOUT DUPERON

Duperon Corporation is the leader in innovative preliminary liquid/solids separation systems. For more than 35 years, Duperon has provided simple yet innovative solutions for a variety of screening and solids handling applications in the water and wastewater industry. Duperon technologies are designed and manufactured in Saginaw, Michigan.