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UTILITY SPOTLIGHT:

SHVUA – South Huron Valley Utility Authority

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SHVUA – South Huron Valley Utility Authority



The South Huron Valley Utility Authority (SHVUA) serves approximately 90,000 residents in seven communities across Wayne and Monroe Counties, including Brownstown Township, Huron Township, Van Buren Township, Flat Rock, Gibraltar, South Rockwood (Monroe County), and Woodhaven. These communities are all situated near Lake Erie, with an abundance of wildlife, waterfowl, and a mix of meadows, marsh, and shoreline along the Huron River, Detroit River, and the lake.

This area of the state is incredibly rocky, as noted by the names of several communities (i.e. Rockwood, Flat Rock, etc.) Construction of the SHVUA facility, as well as its current outfall, required dynamite to be used to blast/clear rock for building foundations and tanks. The underwater portion of the outfall was placed by divers in 40-foot sections and required blasting and removal of about 120,000 cubic yards of rock. The area of the Detroit River downstream of the plant's effluent is a perch fishing hot spot for many local fishermen.

SHVUA was constructed and brought online in 1986 as part of a \$76.1 million project financed in part with an EPA grant, as well as overall interest and needs from the communities in the area. The original 12 million gallons per day (MGD) treatment plant included infrastructure that is still currently in place—primary clarification, biological treatment, and secondary clarification. In 1999, the plant was expanded to add another 12 MGD capacity, essentially carbon-copying the existing processes and adding additional solids handling capabilities via two additional gravity thickeners and one sludge holding tank. Over the years, SHVUA has handled biosolids in a variety of ways, but most recently converted to Class A production. Smaller-scale improvements to the plant have been made consistently over the years to keep things running efficiently and reliably.

Treatment Process

SHVUA's average flow is around 10 MGD but the facility is designed for 24 MGD with 55 MGD of pumping available. Most of the

flow from the area is delivered via gravity, with the exception of their largest pump station, "Trenton Arm", which is approximately three miles from the plant and delivers about a third of the flow. SHVUA operates and maintains this station along with a second, "Odette", while the local communities handle their collection and pump stations individually. The utility works diligently to communicate and coordinate with the communities regarding their systems and the treatment plant.

Raw influent wastewater enters SHVUA and is screened by two mechanical chain & rake-style bar screens. Each unit is sized to handle the full pumping firm primary capacity (55 MGD) with the other out of service. Screenings are collected via sluice and then washed/cleaned before being discarded to the landfill.

Influent flow is then pumped into grit removal via six centrifugal raw sewage pumps. These are VFD-operated, and four range in flows from 4-10 MGD each (100HP), while the remaining two are 15 MGD (125 HP). The facility utilizes two grit

removal/concentrator tanks which were retrofitted in their 2024 upgrade. Each tank is 12 feet in diameter and includes eleven stacked grit trays, designed to achieve 95% removal of all grit larger than 75 microns at average flow and larger than 125 microns at peak flow. Tangential feed creates a vortex pattern where solids settle into the boundary layer on each tray and are swept down into the center underflow collection chamber. Grit is pumped from the chamber while the system is in operation at a rate of 300-400 gallons per minute (gpm) by three 7.5HP pumps to the grit classifiers.

Two “teacup” units handle the grit washing at SHVUA. Both include a conical clarifier and cylindrical base, conveying screw, dewatering auger, and trough. Pumped grit is introduced to the unit in its clarifier (also tangentially), which forces grit into the low velocity area and then down into the sand bed of the bottom of the unit. Screened plant effluent water is added continuously to keep the sand bed fluidized, and rotating stirring barbs assist with this as well as aid in washing by agitating the layers. Heavier organics and organics washed off the grit that accumulate in the clarifier are discharged intermittently via an electrically actuated plug valve located on the side of the clarifier. The washed grit is conveyed and dewatered, then landfilled.

Following grit removal, the flow travels via gravity into primary clarification or can be diverted to a 6 MG equalization basin during wet weather events. SHVUA has four covered rectangular primary clarifiers, each with three bays, each 100 feet x 16 feet. Solids are settled in these clarifiers and transferred to four gravity thickeners. The utility uses six positive displacement pumps, each capable of about 220 gpm, to move the sludge. Scum is also collected off the top of the primaries and sent to the same tanks. The gravity thickener tanks are circular, covered, and 60 feet in diameter. Two additional tanks are used for co-mingling sludge, mixing it, and delivering a consistent 2-3% TS to the facility’s solids handling process.

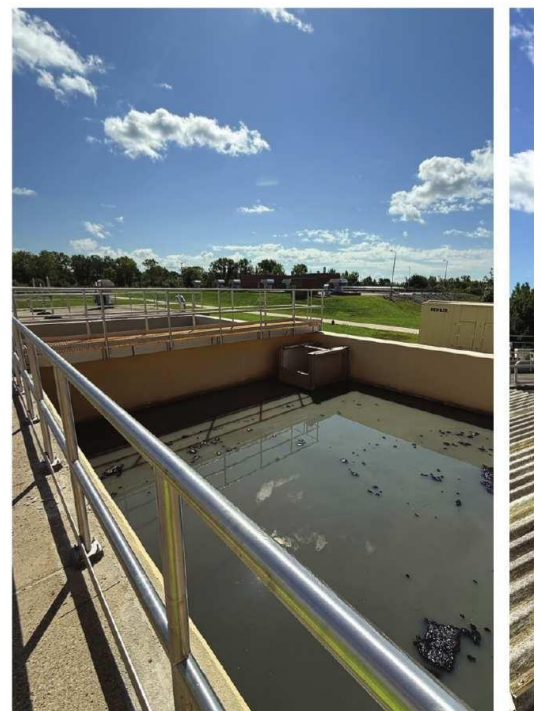
Primary effluent continues on to the facility’s biological process, consisting of four trains/tanks. Each train has multiple stages to help achieve biological nutrient reduction, and each equates to about 1.36 million gallons. The first step in this process is an anoxic stage, where the media is mixed without the presence of oxygen. Each “bio deck” includes four mixers, with the newest being 1HP and the older being 5HP. Bio Tanks 1 & 2 recently were upgraded to fine bubble aeration, including dual core blowers (2x100HP), to deliver air. There are 740 diffusers in these tanks, and they maintain a steady 1.25 mg/L dissolved oxygen (DO) concentration in Stage 2, which is the first oxic

stage. Tanks 3 & 4 utilize mixer/aerators to achieve their aerobic conditions. The aerators range in size from 40HP to 60HP. The plant has realized substantial savings from changing over to the diffused air and VFD-operated blowers, even in just half the tanks.

Flow continues from the biological treatment tanks to four 110-foot-diameter center feed final clarifiers, which were upgraded in the 2024 project. The new clarifiers include suction header sludge withdrawal and submerged effluent launders. Sludge from the biological process is wasted at approximately 200 gpm to the thickener tanks, along with return active sludge (RAS) from the final clarifiers. The facility has Archimedes screw pumps for RAS but recently converted two to submersible pumps. The new submersible pumps are 60HP and rated for 4,450 gpm.

Final effluent continues to disinfection, which includes the addition of sodium hypochlorite and then bisulfite for dechlorination. The effluent serpentine through the facility’s contact chambers and then to their 84-inch outfall. Effluent continues nearly 7,000 feet underground to the shoreline of the lower Detroit River at the edge of Lake Erie and then 6,000 feet under the river before it is discharged through forty 10-inch diffusers.

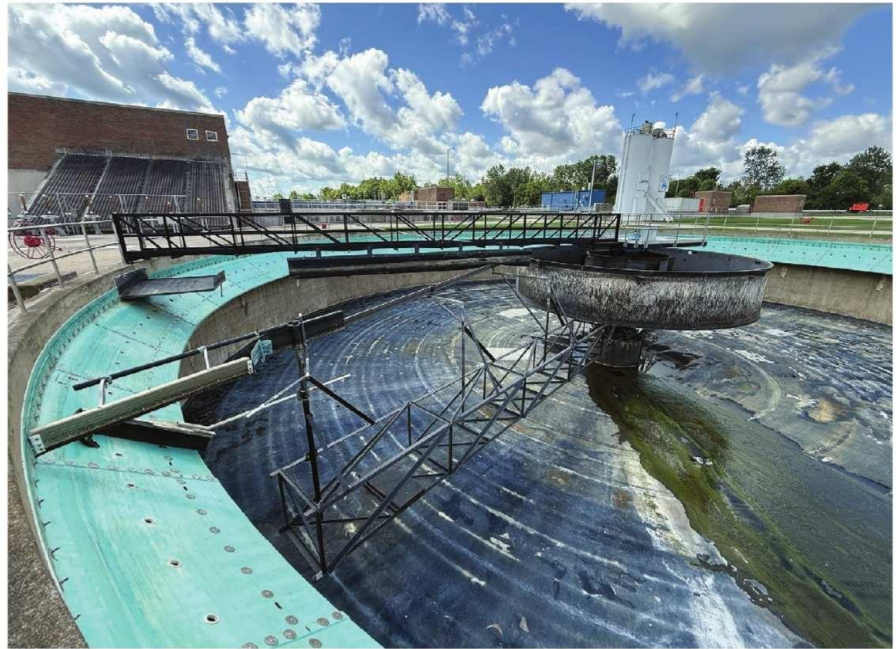
SHVUA’s previous solids handling process included lime-stabilized, Class B biosolids.



They struggled with storage capacity, land application constraints, and increased concerns for the associated costs, as well as inability to allow for landfill disposal. As such, they pursued a new direction with the production of Class A biosolids and working with a company that handled the design of the process as well as comprehensive biosolids management services.

The new process is an advanced, thermal hydrolysis solution. Sludge is thickened to 2-3% in the gravity thickeners and mixing tanks and then transferred to a centrifuge (one onsite). The centrifuge further dewateres the sludge to 18% before it is fed to the process tank. Heat, alkali (potassium hydroxide), high shear mixing, and low-pressure steam are combined to treat the biosolids. The process is entirely automated. The result is a pumpable product with a high solids content (approx. 13-16%), meeting the requirements of Class A. SHVUA also has a multi-year contract with the company, in which they are responsible for the removal/transportation/marketing of the biosolids.

The upgrade to this technology included rehabilitating the existing sludge-handling building and providing and installing the new equipment, as well as sludge loading for trucking offsite. Hydraulically-driven submersible rotary lobe pumps (two duty/one standby, each 600-700 gpm) are installed in



their existing sludge storage tanks (4 MG capacity) and move the sludge to their new loading station. A major benefit of changing to a Class A product has been increased storage capacity. SHVUA averaged about 180 days of storage for Class B and now is nearly double that, averaging about 326 days with Class A. They are very happy with the process thus far, and it's been a relief to have hauling/removal be a non-issue.

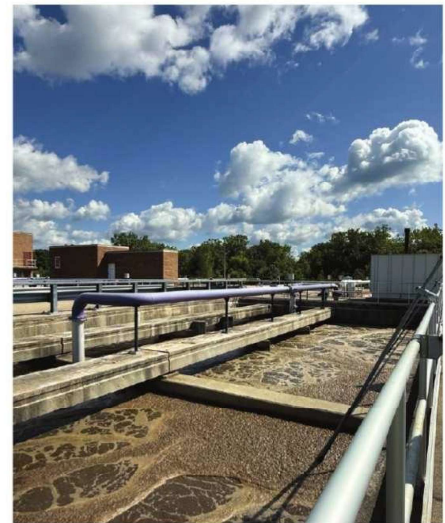
Other Information

The SHVUA team consists of 16 contracted staff members. This includes the Systems Manager, Project Manager, Assistant Project Manager, Operations and Maintenance Managers, Lab Supervisor, and then technicians in the lab, maintenance, and operations, as well as an administrative assistant. SHVUA is working on cross training for their in-plant groups and encourages development and education. Several staff members have maintenance and/or WRRT credentials in addition to wastewater licenses. The facility is contract operated by Jacobs.

SHVUA is unique in that it is staffed only 12 hours a day, 365 days a year, which is not as common for large facilities. This requires detailed coordination and scheduling. Color coded and role-specific scheduling (operations, biosolids process, preventative maintenance, and housekeeping) have helped streamline this process. They also have integrated a lot of data into SCADA, especially for the biosolids process and effluent monitoring. The facility has 42 alarms, connected to real time data, that on call staff are responsible for overseeing.

An apparent theme with SHVUA is teamwork and collaboration. SHVUA does not have any directly hired staff but still operates its facility, financial, legal and other obligations seamlessly. Operations staff are thoroughly embedded in the day-to-day





operations as well as critical programs, such as their Industrial Pretreatment Program (IPP). The Project Manager is the leader for the operations team and is overseen by the Systems Manager. The System Manager and Project Manager maintain frequent contact to stay ahead of O&M issues, meet their regulatory requirements, optimize the use of the SHVUA budget, address any concerns from residents and SHVUA communities, and plan future improvements.

SHVUA leadership has decades of experience in wastewater, spanning both large and small facilities, and they bring their extensive knowledge, along with an eagerness to develop employees and create a positive work environment each day. SHVUA staff also interact and work in partnership with the local communities and watershed program. Resources are shared when it makes sense, and the communication channels are always open.

SHVUA staff have fine-tuned and finessed plant operations to be able to proactively handle a wide range of scenarios, wet weather flows, and other challenges. They've identified bottleneck areas, as well as areas that provide redundancy and opportunity. They have strict operational processes that come into play, as needed. With an average of one wet-weather event each month requiring action, having a concrete decision-making process has proven to be priceless. Team members have presented several technical topics at industry conferences, submitted articles for publications, and have also received accolades for their work at the facility. They continue to work on efficiently operating their facility while eagerly sharing their experience and strategies with other industry professionals and partners. 