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Daniel Wurst
Wastewater Superintendent
Telford, Pa.



The team at the Richmond Wastewater Treatment Facility includes, from left, Aaron Krymkowski, lead mechanical operator; Kendall Chamberlin, plant superintendent; Dameon Young with Working Dog Septage Service; Allen Carpenter, lead process operator; and Bradley Snow, operator in training.

Saved by Septage

WHEN A CREAMERY CLOSED AND LEFT HIS TOWN'S CLEAN-WATER PLANT SHORT OF REVENUE, KENDALL CHAMBERLIN AND HIS TEAM DEvised AN INNOVATIVE SOLUTION

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Carolyn Bates**

The Richmond clean-water plant was humming along just fine until the Vermont town's creamery shut down in 1999.

"With the creamery, our flows were about 150,000 to 200,000 gpd," says Kendall Chamberlin, plant superintendent. "When they left, our flows dropped to about 30,000 gpd. They took 67% of our revenue with them. There was a huge conundrum: What are we going to do?"

The answer was to take in septage. Chamberlin and engineers with the Hoyle, Tanner & Associates consulting firm devised a septage receiving and treatment system as part of a 2005 plant upgrade. That filled the gap in revenue, especially when the COVID-19 pandemic hit and most other facilities in the state shut down septage receiving, making Richmond the go-to place for Vermont's haulers.

The upgrade also positioned the facility to meet new, stricter effluent phosphorus limits. Today the plant operates on a solid financial foundation and with a collection system extensively rehabilitated in 2009. The facility earned the Green Mountain Water Environment Association's 2021 Facility Excellence in Wastewater Award.

'NOT POPULAR'

Richmond, in Vermont's northwest corner, lies in the foothills of the Green Mountains and on the east edge of the Lake Champlain valley. The Winooski River bisects the town, which is home to the Round Church, a 16-sided meeting house recognized as a National Historic Landmark.

The clean-water plant was built in 1970. Chamberlin started at the plant since 1985 and has been superintendent since 1988; he holds a Grade 5 Domestic Wastewater license (highest). "When the plant first came online, probably three-quarters of it was for the creamery, and the rest for the village," he says.

When Chamberlin proposed septage receiving as a way to make up for the loss of revenue from the creamery, "It was met with outright derision and was not popular at all," he recalls. "They had tried taking in a load

“These last couple of years we’ve brought in more revenue from septage than from all the other customers connected to the system.”

KENDALL CHAMBERLIN

of septage once, and it basically killed the plant. It was a big no-no, and the town select board remembered that.

"But we managed to make it work because we treated the septage differently. Instead of putting it through the process, we just dewatered it. Haulers arriving at the plant connect to the hose that runs into the building and gravity-feeds a septage acceptance unit (Lakeside Equipment) with rag removal capability.

The septage is mixed with waste activated sludge in a pair of 25,000-gallon aerated holding basins. From there the mixture is fed to an aerobic digester, after which it is dewatered to 33% solids on a Fournier rotary press. The cake is sent to a composting facility.



The Richmond treatment plant has a dry-weather design capacity of 222,000 gpd and treats an average of 70,000 gpd.

Richmond (Vermont) Wastewater Treatment Facility

www.rva.gov/public-utilities/wastewater-utility

BUILT:
1971 upgraded, 2005

POPULATION SERVED:
~1,000

FLOWS:
222,000 gpd design,
70,000 gpd average

TREATMENT PROCESS:
Extended aeration activated
sludge, cloth disc filtration

TREATMENT LEVEL:
Tertiary

**RECEIVING
WATER:**
Winooski River

BIOSOLIDS:
Sent to composting

AWARD:
2021 Facility Excellence Award,
Green Mountain WEA

ANNUAL BUDGET:
\$790,000 (operations)

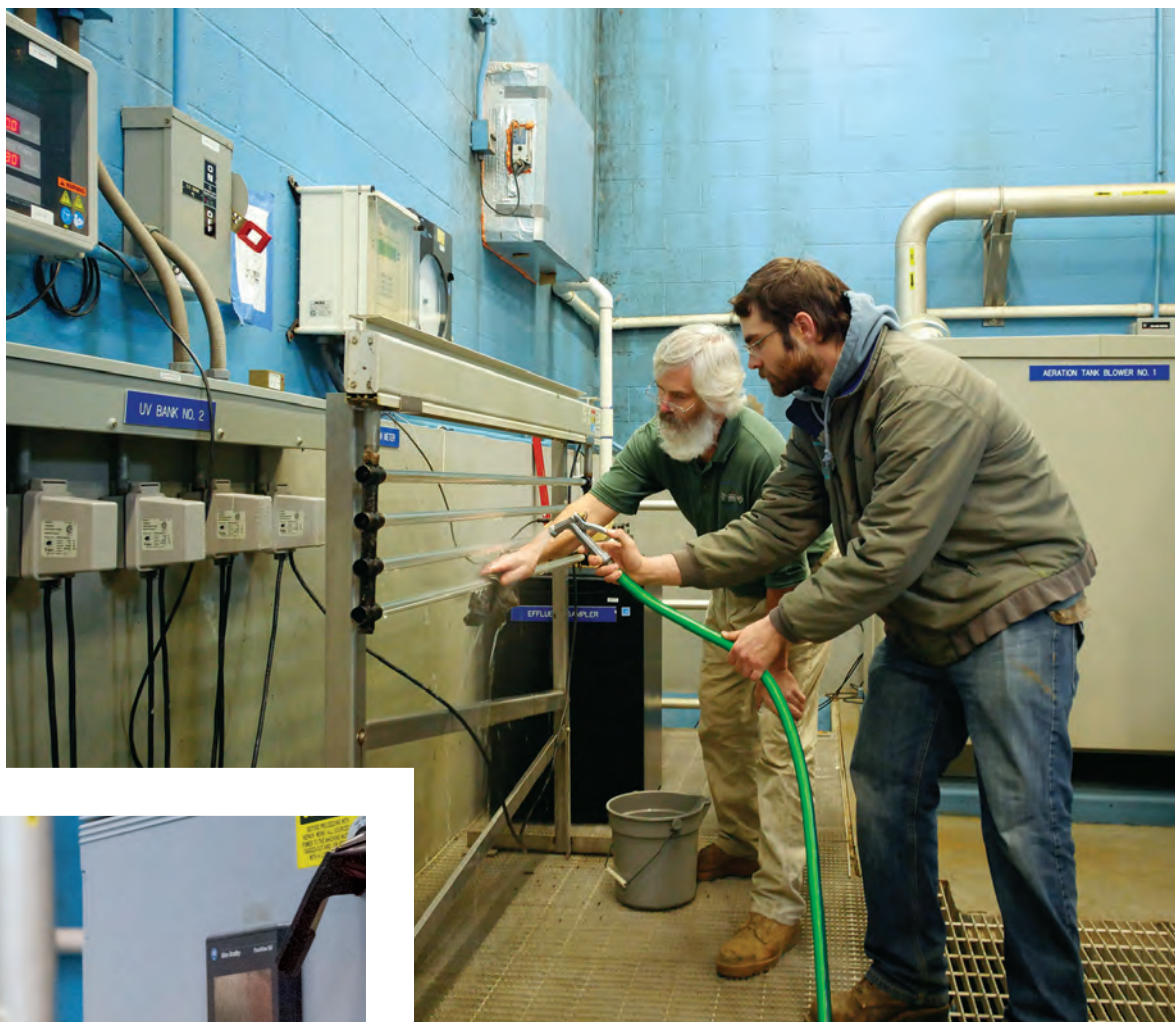


REVENUE REVIVAL

“Septage really was a savior for Richmond,” Chamberlin says. “These last couple of years we’ve brought in more revenue from septage than from all the other customers connected to the system.” That’s because the COVID-19 pandemic turned Richmond into a near-monopoly.

“When we did the upgrade in 2005, we planned on taking about a million gallons of septage per year, but with our tankage, and working around our low flows from the town, we were averaging before the pandemic probably 250,000 gallons a month, or 3 million gallons a year. We had thought we might be able to take more than that because it worked so well.

“When the pandemic started, the other facilities shut down almost without exception. Either due to reductions in staff or other reasons, they just were not taking septage.



Kendall Chamberlin (left) and Bradley Snow clean the bulbs in a TrojanUV3000PTP UV disinfection system.



“I’m actually the old guy here at 57. And all of my crew members are under 30.”

KENDALL CHAMBERLIN

“We made sure all the haulers knew that Richmond was still open for business.” Haulers came from all over Vermont and some from neighboring parts of New York and New Hampshire.

“I give a lot of credit to our crew,” says Chamberlin. “They knew there was a huge demand for septage

treatment in the state, and there really was no other option. So we took our precautions and stayed open, and our number went up to over a million gallons a month. Before the pandemic we budgeted a maximum of about \$200,000 in revenue. Last year we had about \$500,000, which is quite a bit more than we got from the creamery.”

CUSTOMER SERVICE

Service to the haulers played a key role in the septage program’s growth: “From the start we’ve really paid attention to customer service. They come into the office and we talk to them. We have coffee and snacks available. They’re doing a job just like we are; we all have to work together. If we treat people that way, they’re going to want to come to Richmond.”

Billing is on the honor system. Before deciding how to charge, Chamberlin talked to staff at various facilities. “I spoke to some folks about metering

Kendall Chamberlin, superintendent of the Richmond Wastewater Treatment Facility, gives credit to his crew for the plant’s success.

septage, and a lot them had some issues with it,” he says. “I also talked to people who did not meter septage. They told me, ‘Look, these folks are no different than you or I, and really, how many dishonest people do you know?’

“If they have 3,000 gallons on the truck, they’re going to tell you they’ve got 3,000 gallons. Our numbers have shown that. We keep track of our waste sludge and the volumes we press, and invariably we’re within maybe 1,000 gallons out of a million or more gallons a month. The haulers’ slips are right on the money.”

UPGRADE FOR PHOSPHORUS

Another main purpose of the 2005 plant upgrade was to comply with the state’s new phosphorus rules. Eugene Forbes and Kirsten Depietro-Worden of the Hoyle, Tanner firm redesigned the entire facility, adding anoxic chambers for phosphorus removal, fine-bubble diffusers (Sanitaire, a Xylem brand) in the aeration basins, two Aerzen blowers, two cloth disc filters (Aqua-Aerobic Systems) and UV disinfection (Trojan Technologies).

In 2009, using federal stimulus funding, Richmond completed a \$1.5 million rehabilitation of the collection system that included a system inspection

Richmond Wastewater Treatment Facility PERMIT AND PERFORMANCE			
	INFLUENT	EFFLUENT	PERMIT
BOD	610 mg/L	2.4 mg/L	50 mg/L
TSS	747 mg/L	1.8 mg/L	50 mg/L
Phosphorus	22 mg/L	0.13 mg/L	0.8 mg/L

and analysis led by Alan Huizinga and Peter Pochop of Green Mountain Engineering, cured-in-place lining of some five miles of pipe, and repair or replacement of 30 manholes.

The collection system delivers wastewater by gravity to a wet well at the treatment plant. From there the facility’s original lift pump brings it to the headworks to flow by gravity through the process. A Complete Plant (Lakeside Equipment) removes debris and grit; the flow proceeds to three anoxic chambers with Flygt (a Xylem brand) mixers and then to the aeration tanks.

After aeration the effluent enters two rectangular clarifiers, ahead of which sodium aluminate is added for settling and phosphorus removal. After the cloth disc filters and UV disinfection, the final effluent is discharged to the Winooski River.

KUDOS FOR THE TEAM

Making it all work, besides Chamberlin, are Aaron Krymkowski, lead mechanical operator; Allen Carpenter, lead process operator and Bradley Snow, an apprentice and operator in training. They handle both the wastewater and drinking water sides; drinking water is drawn from a well, chlorinated and delivered to a hilltop reservoir for gravity distribution.

“We are a little bit unusual in that most plants in this area have a lot of older folks and not very many young folks,” Chamberlin says. “I’m actually the old man here at 57. And all of my crew members are under 30.” Krymkowski (Grade 3) has been with the plant for three years; Carpenter (Grade 2) for six. (Tyler Booska, an operator in training, was a valuable contributor during the pandemic but has moved on to an operator position in Burlington.)

To maintain a capable staff, Chamberlin has turned what had been a problem into an asset. “It’s no secret that small towns like ours don’t necessarily pay a large amount,” he says. “We’re on the outskirts of Chittenden County, which is the most populated county in Vermont.

“I would hire folks, they would get a little bit of training in Richmond, and then they would get stolen away by surrounding towns. A fair number of operators in the county have gone through Richmond and worked for me. So rather than try to fight against that, we made it our strength.

“We have a very good training program here. When new team members come in, they get training in basically all the operations and systems of the



Trout live in effluent from the Richmond plant that’s piped into an idle basin. They provide proof of the plant’s effluent quality.

PROOF POSITIVE

Kendall Chamberlin had heard enough of people bad-mouthing wastewater treatment plants as polluters of streams.

“A lot of people were saying, ‘You’re destroying the river. You’re putting sludge in the river. There are no fish left in the river,’” says Chamberlin, superintendent of the Richmond Wastewater Treatment Facility.

So he took action. The facility has two aeration basins but uses only one. So Chamberlin rigged up a system to pump a portion of disinfected effluent into that idle basin, and there he placed brown, brook and rainbow trout.

The trout live in the basin year-round; plant team members feed them commercial fish food pellets. There’s no need to aerate the tank because the effluent is rich in oxygen. Midge flies prosper in the basin, and some duckweed grows on the surface.

“It’s like a cold-water pond,” Chamberlin observes. “It’s a big hit with the people who tour the facility. A lot of people don’t look at plants like ours as clean-water facilities. They think we’re just polluting the river. It’s pretty hard to make that argument when you’re standing at the basin railing feeding trout that are a foot long.”



Checking the Complete Plant system (Lakeside Equipment) are, from left, Kendall Chamberlin, Allen Carpenter and Aaron Krymkowski.

facility. They do tend to move on, but over the years we've gained a reputation that if you start your career at Richmond, a lot of people will be wanting to hire you. We turn that to our advantage as much as possible."

STRATEGIC HIRING

It works largely because of Chamberlin's approach to hiring: "We say, let's hire folks who maybe wouldn't be hired at some other facilities because they don't have any direct wastewater experience. A lot of the people I hire would be handy with HVAC, or they might have been in construction or landscaping or working for a school. They'll have a background where they know how to work.

"We've found that if we hire those people, they are very interested and hungry for training to break into a career. I mentor them and give them a taste of the facility from A to Z. They do everything. I'll send them to a select board meeting now and then. I'll have them answer direct customer calls and follow projects from start to finish.

“Almost without exception, every operator who has come through this facility has remained my friend.”

KENDALL CHAMBERLIN

worked in Richmond; you did everything. We'll hire you as a dewatering operator, but we know that if you have to pump a manhole, you can do it.

"A lot of people have left here because of a pay increase they couldn't ignore. But one thing I regard as the highlight of my career is that almost without exception, every operator who has come through this facility has remained my friend. They speak well of me.

"After that, when they go to another facility, especially a bigger facility, they find it very easy because they've been exposed to all parts of it. The facilities are really interested in getting them because they haven't done just one thing. They'll say, 'You



Biosolids are dewatered to 33% solids on this Fournier rotary press.

"I tend to be very collaborative. I'm the super, and things are expected of me, but I give the team members a chance to specialize and find out what they really like. We'll switch our duties around to let people shine where they like to shine. When they've left, I'm comfortable saying they all exceed my skill. They are fantastic people."

RECALLING A MENTOR

Chamberlin drew early-career inspiration from Willard "Bill" Conant, the plant superintendent who hired him at Richmond. Chamberlin was pursuing an environmental science degree at Johnson State College while working for a laboratory that did sampling at wastewater treatment plants.

"Richmond was one of the facilities that I sampled," he recalls. "I got to know the team here. The No. 2 guy got an offer he couldn't refuse to go to a surrounding town. So the next time I came to get samples, Bill said, 'Hey, we've got a job open. Here's an application; fill it out.' Lo and behold I got the job. Bill was a fantastic mentor, and he got me hooked on the potential for this career."

Twenty years later, Chamberlin went back to the college and finished his degree. He was humbled to see Richmond win the state award for facility excellence. "Every plant in Vermont did outstanding work through the pandemic," he observes. "I don't know how they picked us in a year when everyone was exceptional." **tpo**

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