

Urban development to feature Living Machine

Unique wastewater treatment system will serve hundreds of building users

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Hassalo on Eighth, an approximately \$192 million development, is transforming the Lloyd District - in part because of its Living Machine.

The nearly \$2 million wastewater treatment system will be one of the largest of its kind in an urban area, said Kyle Andersen, lead project architect for GBD Architects.

"Not only are we keeping sewage out of the system, but we are also reducing the water need," he said. "This shows we are being stewards of the environment."

American Assets Trust, the developer, is aiming to finish the four-block residential and retail project - including three new buildings containing 657 residential units and 58,000 square feet of retail space, and rehabilitation of an existing office building - in fall 2015.

When the Living Machine is constructed, it will treat wastewater from residential, office and retail users so that it can be reused for flushing toilets, irrigating landscape and cooling towers in each of the four buildings.

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Courtesy of GBD Architects

Above ground, the 'Living Machine' will feature four tanks - trickling filters, which remove suspended solids and particulates from liquids. Purified liquids are further scrubbed and polished under the landscaped area above the four tanks by tidal, wetland cells. They eventually convert the liquid into water suitable for irrigation and flushing toilets.

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Living: 20,000 gallons of water may be reused daily

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The system works like a natural wetlands by using tidal, wetland cells along with other natural processes to clean and treat effluent. The first step takes place in a dark tank where microbes, enzymes and bacteria break down waste, remove its odor and transform it into a nutrient, Andersen said.

While the waste settles at the bottom of the tank, the liquid is sprayed by "trickling filters" against the wall. Solid matter, which at this point is more like sludge, falls to the bottom and returns to the dark tank to go through the anaerobic process again.

After being sprayed by the trickling filters, the liquid goes through a scrubbing and polishing process, passing through tidal, wetland cells that are planted and move up and down.

The cells will sprout above the ground as plants that look like any other plants, but below ground scrub and polish the liquid that passes through.

"That's where the engineering is all figured out," Andersen said. "Knowing how many cells are needed and the volume and area of those cells."

Contaminants are zapped with ultraviolet light. At this point, the liquid will meet environmental quality standards that would nearly make the water safe to drink, he said.

At this point the purified water will spend some time in a storage tank. Water that is not used for irrigation or toilet flushing will be disposed into the groundwater through two 40-foot-deep, 4-foot-wide dry wells dug deep into the earth.

"It gets deep enough so it can find the aquifer," Andersen said.

The Living Machine could help change perceptions of reuse of treated water in urban settings, said Geoff Winslow, a senior associate and engineer with Glumac, the mechanical engineer for the project. He said that's because it does not use as many filters to purify the water.

"If you take sewage and treat it with all the science you can muster, the end result will always be looked at with suspicion," he said. "But if we take water from a river and (treat it) through a natural process, then it's looked upon more favorably. Hopefully the Living Machine, using more of a natural process,

Coordination is key for Hassalo on Eighth construction

Crews last week resumed their brisk pace at Hassalo on Eighth, after snow halted work temporarily.

Greater construction challenges loom for the \$192 million project, where 1 million square feet of residential and retail space is being built on four city blocks in the Lloyd District. American Assets Trust is adding one 21-story building, one six-story building and one five-story building with 657 residential units, 58,000 square feet of retail space and 1,200 underground parking stalls.

Major coordination work will be needed when the project goes vertical in March, said Travis Harris, project superintendent for Turner Construction. Eight subcontractors with about 130 people are working on the project, with separate crews tackling each of the buildings at the same time, he said.

"It's a very parallel project," he said. "There's a lot of activity. Doing it one building at a time would certainly be easier, but we're going to hit the market (with these buildings) at the same time."

By summer, 30 subcontractors with 350 people will be on the project site during the six-month peak period, he said.

Crews last week scrambled to catch up on concrete pours for the three-level parking garage. Harris said he is hoping to start building above ground next month.

Another challenge is building on a site with three sides next to public transportation – light rail, streetcar and bus lines make it impossible to close down those streets when needed, Harris said.

"The real tough one is the MAX line on Holladay Street because of the proximity of the general public to our work site," he said.

To compensate, more cranes – rather than forklifts or trucks – will be used, and more coordination will take place, Harris said. Turner also will erect barriers in certain areas to keep the work site safe, he added. – Jeff McDonald

will be seen in a more positive light."

The system is designed to treat 45,000 gallons of water per day, with about 20,000 gallons per day expected for reuse. The rest of the treated water will go into the aquifer, said Katie Bohren, an environmental scientist with Biohabitats, which worked on the design for the Living Machine system that will be installed at the Hassalo on Eighth site.

The machine is unique because it uses a constructed wetlands system to treat waste-

water in an urbanized system, Bohren said. It also meets stringent environmental qualifications, she said.

"The most exciting part of this is that we're treating 100 percent of the wastewater from the three towers and the existing site, and reusing about a third," Bohren said. "We are taking all that flow out of the sanitary sewer system."

After about five years, the cost to operate the system is expected to be less than the

cost to connect to traditional water and sewer systems, she said.

The system's initial costs were nearly offset by reductions in water and sewer system development charges as a result of installing the Living Machine, Andersen said.

Project leaders will watch the machine's meters carefully, he said.

"We'll be measuring what comes into the building, but also what's reused and what is or is not going into the sewer," he said.



DJC file
The Living Machine at the Port of Portland's headquarters uses wastewater treatment processes similar to those that will be used at Hassalo on Eighth.