

Roadway with recycled toilets is world's first official 'Greenroad'

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A toilet-seat plaque is embedded in the completed sidewalk. Credit: City of Bellingham

Greenroads, a rating system developed at the University of Washington to promote sustainable roadway construction, awarded its first official certification to a Bellingham project that incorporates porcelain from recycled toilets.

The Greenroads Foundation made the award last month to the Meador Kansas Ellis Trail project, which was recognized for doing things such as using low-energy LED streetlights, managing [storm water](#) with porous concrete, and accommodating [cyclists](#) and [pedestrians](#).

The newly widened sidewalk also incorporates more than 400 recycled

[toilets](#), crushed into what the project engineers have dubbed – wait for it – "poticrete."

When project engineer Freeman Anthony with the City of Bellingham heard that a local nonprofit was replacing hundreds of toilets, he called up his regular ready-mix concrete company.

"They said: 'Yeah, I think we can do something with that,'" Anthony said. "'We'll throw it through the crusher and see what we come up with.'"

The project ended up using about 5 tons of toilets, roughly a quarter of the volume in one section of the sidewalk. Perhaps a bigger achievement is that the project incorporated as much as 80 tons of recycled concrete in sidewalks, curbs and gutters, and pushed the roadway asphalt's recycled content up to 30 percent. Overall, it qualified for a Greenroads silver certification.

Greenroads aims to offer a roadway equivalent to the popular LEED rating system used for green buildings. Principal investigator Stephen Muench, a UW associate professor of civil and environmental engineering, said Greenroads is the only roadway accreditation system that is actively certifying projects.

"It's a big milestone for us," said Jeralee Anderson, who this week defends her UW doctoral work developing the Greenroads system. The certification, she noted, marks the culmination of many years of work.

After first unveiling the rating system in 2010, the team worked with the UW's Center for Commercialization to launch a nonprofit company based in Redmond. The company is the caretaker of the Greenroads Rating System and provides independent, third-party certification of sustainable roadway projects. The foundation has sponsorship from eight

companies in the transportation and construction industries.

Anderson acts as executive director of the Greenroads Foundation, and former UW master's student Craig Weiland works as the principal project engineer.

The Bellingham road is the first official Greenroad, but dozens of projects have already been case studies for the research team. Those evaluations offered informal feedback on a project's sustainability while helping the team design a rating system that gave meaningful results without requiring an excessive amount of paperwork.

Over the next few months, Anderson and Muench estimate they will certify at least three more roads. The 12 projects now under contract include eight in Washington and one each in California, Colorado, Nevada and Texas. The foundation is negotiating with managers for another 10 to 20 projects that would like to pursue certification.

"I'm really happy where we're at with the Greenroads Foundation. I think the number of projects we're reviewing is about right," said Muench, who's currently on sabbatical leave and contributing time to the nonprofit. "I'd like that number to grow in the next year, and I think it will."

A number of international collaborations are under way. Closest to completion, Muench said, is a project that would establish a [rating system](#) tailored to South African roadways and then apply those methods to South African projects.

The foundation also is developing an accreditation process for people to become certified experts on the Greenroads system. That program is expected to launch late this year.

On the research side, Muench currently works with a half-dozen other students on sustainable roadways. One doctoral student is developing a framework for a rating standard that would work for any country in the world. Another doctoral student is creating a simple energy and greenhouse gas calculator specifically tailored to road projects that will be made available as a free online tool.

UW research contributing to Greenroads is funded by Transportation Northwest, the State Pavement Technology Consortium, the Western Federal Lands Highway Division and the Oregon Department of Transportation.

"I think Greenroads has really done a great job of building a comprehensive assessment for building better roads, I don't think you'll find a better one out there," Anthony said. "I really hope to see it flourish."

Provided by University of Washington

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