

Unique Application

**Greendale
resurfacing job
includes green
shoulder**

By Barry Gantenbein,
editor, Western Builder

The roadside along 51st Street between College Avenue and Grange Avenue in Greendale, Wis., is grass-covered, with its only distinguishing characteristic the lack of an aggregate shoulder alongside the asphalt pavement.

Instead of a crushed aggregate shoulder, a 2-foot-wide asphalt shoulder abutted by a 6-foot-wide green shoulder has been constructed along 51st Street as part of a village of Greendale project to pulverize and resurface the existing roadway.

The green shoulder is a 6-foot-wide plastic grid system that lies beneath the grass surface adjacent to the asphalt shoulder. It is designed to be a drivable surface, decrease shoulder maintenance and improve storm-water quality.

Designed by R.A. Smith & Associates, Inc., Brookfield, Wis., the green shoulder is a 6-inch-deep plastic grid system, filled with a mixture of stone and topsoil, and overlaid by 2 inches of topsoil to sustain grass growth.

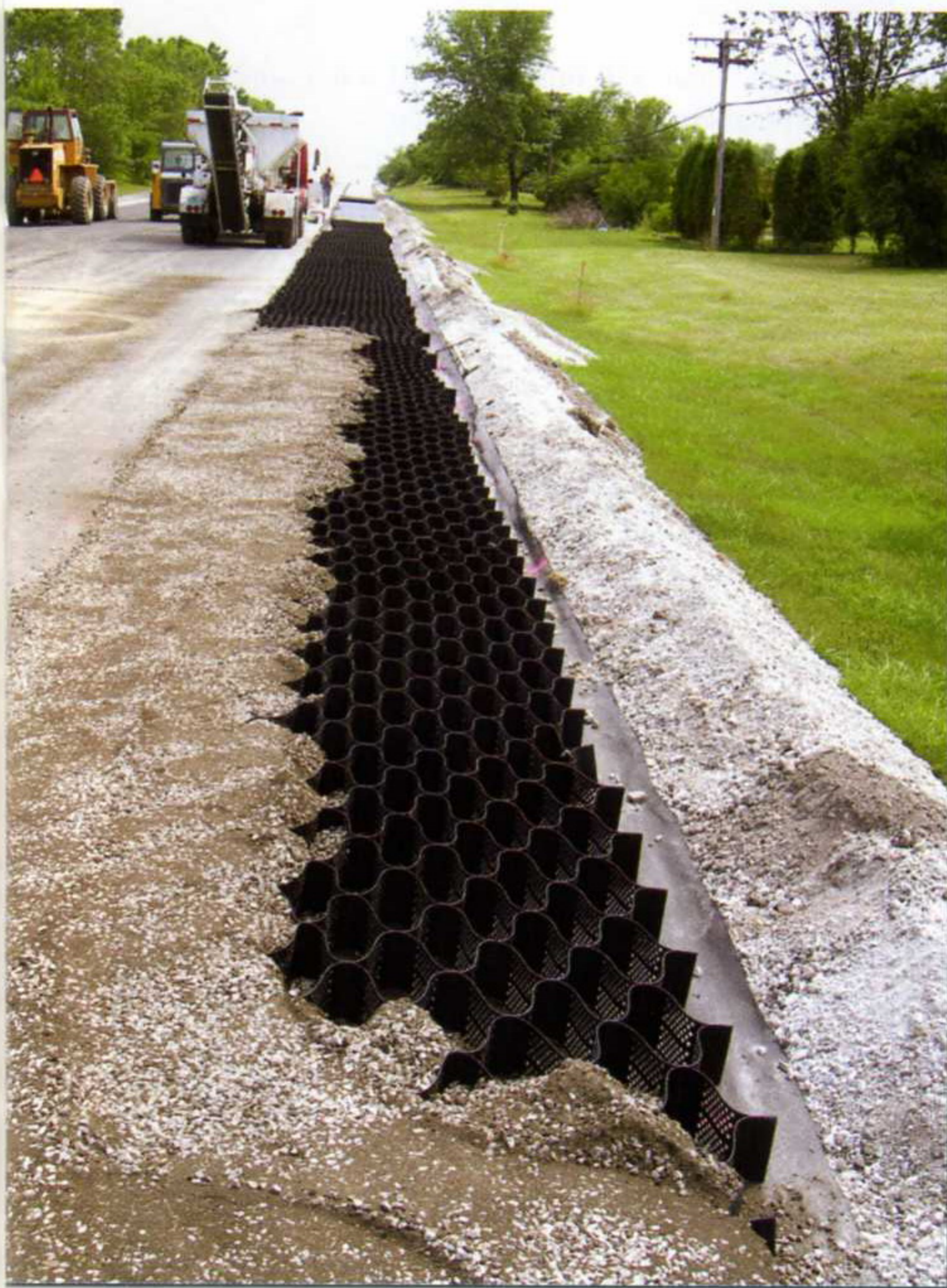
The green shoulder is designed to support the weight of trucks and other vehicles that leave the roadway and drive onto the shoulder.

"It's a drivable surface, yet it grows grass and maintains grass growth," said Len Roecker, R.A. Smith's project engineer and project manager.

The green shoulder has been placed for 5/8-mile on both sides of 51st Street, for a total of approximately 2,000 feet.



The plastic grid system that gives form to the green shoulder was filled with a mixture of 65 percent stone and 35 percent topsoil. Stone used in the mixture was 3/4-inch limestone chips.



A photo of the grid system as it was filled with a mixture of stone and topsoil. The green shoulder is designed to support the weight of vehicles that leave the roadway and drive onto the shoulder.

High-density plastic in a waffle pattern gives form to the green shoulder system.

The geotextile plastic grid is filled with a mixture of 65 percent stone and 35 percent topsoil. Stone used in the mixture was 3/4-inch limestone chips.

"You get the stone-aggregate interaction within each of the confined cells. That gives you the strength. The cells contain the material, and keep it from moving anywhere. You don't get lateral movement," Roecker said.

The Contractors

Del Sievert Trucking, Inc., Franklin, Wis., supplied the custom mix of limestone and topsoil used on the job.

Shoulder work was done by Werner Brothers, Inc., Ixonia, Wis., working as a subcontractor to Black Diamond Group, Inc., Oak Creek, Wis., the prime contractor on the resurfacing job.

R.A. Smith & Associates served as the project engineer on the job, and is also the village engineer for the village of Greendale.

One of the reasons R.A. Smith proposed the green shoulder is an expected reduction in shoulder maintenance compared to an aggregate shoulder.

"Prior to this project, we had a lot of problems with the shoulders blowing out or rutting from cars coming off the edge of the pavement. Public Works would have to fill those in routinely," Roecker said.

If the green shoulder system is damaged, such as a snowplow destroying a section, the high-density plastic of the grid system can be cut with hand tools such as a tin snip or small saw to make a repair.

"A damaged section can be cut, pulled out, and a new portion put in without any real trouble," Roecker said.

The 2-foot asphalt shoulder and 6-foot green shoulder creates an 8-foot shoulder that allows just about any type of vehicle to leave the pavement without sinking.

Wheels of vehicles that drive onto the green shoulder may leave an impression of up to 2-1/2-inches deep in the grass, but the system will prevent vehicles from sinking to their axles, even when the ground has been saturated with water in the spring or after a heavy rainfall.

Grass has been planted on top of the system.

"You can't tell that it's there anymore. It came in exactly as we hoped," Roecker said.

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The green shoulder will improve stormwater quality, compared to a typical crushed aggregate shoulder.

"The plastic grid has holes that look like Swiss cheese, so drainage that goes over the top can run down through the medium as well as go laterally through it. It drains both vertically and laterally," Roecker said.

As prep work for construction of the green shoulder, a binder surface was placed by the contractor.

"Then they came in and prepared the shoulder area by winging back the material that would later be used against the back side of the shoulder," Roecker said.

The grid structure was laid on the subgrade, then fastened with rebar and caps to keep the structure in place and to keep the shape of the cells.

A plate compactor was used to compact the material in the grid structure, which was placed butt up against the asphalt shoulder.

R.A. Smith created the shoulder design based on product support materials from Presto Industries in Appleton, Wis., the manufacturer of the high density plastic grid.

State First

The grid system has been used for applications such as turf maintenance corridors and temporary parking, but the project in Greendale is believed to be the first use of the system for a roadway shoulder in Wisconsin.

"We learned from the other applications, and made it work for this application," Roecker said.

R.A. Smith specified Presto Products cellular grid for the project, as well as the mixture of stone and topsoil, and a sieve analysis to ensure that the proper mixture of stone and topsoil was used on the job.

"Not a lot varied from the original spec. It pretty much went in the way everyone anticipated," Roecker said.

He believes the green shoulder will have a lifespan no different than other roadways.

"We're confident this will be a 30-plus-year product. It may need some miscellaneous maintenance in terms of topsoil dressing in the future, if, for instance, a snowplow or some other vehicle damages the upper surface of it," Roecker said.