



## Beautiful pavers serve purpose, handle storm water runoff

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The colored interlocking bricks, called pavers, on Thule and Payne streets are pretty and they serve a purpose: handling storm water runoff.

Dealing with storm water runoff is important because of Environmental Protection Agency and Department of Defense mandates. Engineers are charged with developing ways to reduce storm water runoff, which would otherwise flow into streams, rivers, or lakes carrying possible contaminants and erode stream beds.

In 2009, the Energy Independence and Security Act established into law new storm water design requirements for federal development and redevelopment projects. The new requirement is to reduce storm water runoff associated with new construction.

"We need to ensure we don't create significant storm water runoff issues as a result of our construction," said Randy Hawke, 21st Space Wing Civil Engineer Squadron architect. The issue is especially important on Peterson Air Force Base, where water runs into Sand Creek.

Permeable pavers permit storm water and snowmelt to drain through the spaces between the paving blocks and into a subsurface detention area, said Fred Brooks, 21st CES civil engineer. From there, the water filters naturally into the ground and ultimately recharges the aquifer.

"By creating subsurface detention and filtration areas, the paver system dramatically reduces, or even eliminates, the need for retention ponds," he said.

Already, pavers on Paine and Otis streets, between Hamilton and Stewart avenues, have demonstrated they are an efficient way to handle storm water runoff, Mr. Brooks said. With all the recent rain, there has been a noticeable reduction of storm water flow in that area.

Thule Street, which had a low point in the road, would have required an extension of the storm sewer lines.

"That would have exaggerated our already maxed-out storm sewer system," Mr. Brooks said. "Our piping infrastructure is working at capacity. Any additional inflow equals flooding downstream."

Permeable pavers do cost more than asphalt, Mr. Brooks said. The pavers on Thule Street cost about \$470,000 - about twice the amount to pave with asphalt. The project was funded under the American Recovery and Reinvestment Act, much like the way state and country road repair projects were funded.

"It is more costly than a standard roadway, however the additional storm water storage and maintenance reductions are worth the investment," Mr. Brooks said. "This road is projected to outlast a standard asphalt road by two or three life cycles."

And, the pavers will save the base money, Mr. Brooks said. Pavers are flexible and allow movement during the freeze and thaw cycle without damage to the road. Annual painting of traffic lines is not necessary since the full depth color of the yellow and white pavers will not fade.

"There is no need to seal the pavers every five years, like there is with asphalt," Mr. Brooks said. "There is no need to mill an overlay every 10 years, like with asphalt."

The only maintenance on pavers is to vacuum the road once a year with a street sweeper.



Construction crews are expected to complete a road project on Thule Street, next to McDonald's Restaurant, on Peterson Air Force Base by the end of August. Permeable pavers allow storm water to seep through the spaces between bricks into a subsurface detention area thereby reducing storm water runoff, which is part of Environmental Protection Agency and Department of Defense mandates for all federal development and redevelopment projects. (U.S. Air Force photo/Rob Bussard)

The Thule paver project is expected to be completed by the end of August. Thule Street is being designed as one of three service roads leading into the development of a new business park concept known in the base's long term development plan as the Triangle Area.

The Triangle Area, which includes the area of the former base commissary, will be designed based on energy saving sustainable guides, Mr. Hawke said. Contracts on the project are expected to be awarded in the fall.

"The architectural standards for this area will be based on sustainable and energy saving architectural construction criteria for the future of Peterson Air Force Base," Mr. Hawke said. "Permeable pavers are part of this architecture."

*Paver project at a glance:*

- Maintenance free -- colored paver stones eliminate need to restripe
- Repair friendly -- individual pavers can be removed and replaced for underground work
- Environmentally friendly -- does not require a separate storm water pipe line
- Big picture development -- Thule Street is part of a future development area
- Compliant -- meets the Environmental Protection and Department of Defense mandates to reduce storm water runoff
- Attractive -- the pavers are attractive with environmental benefits