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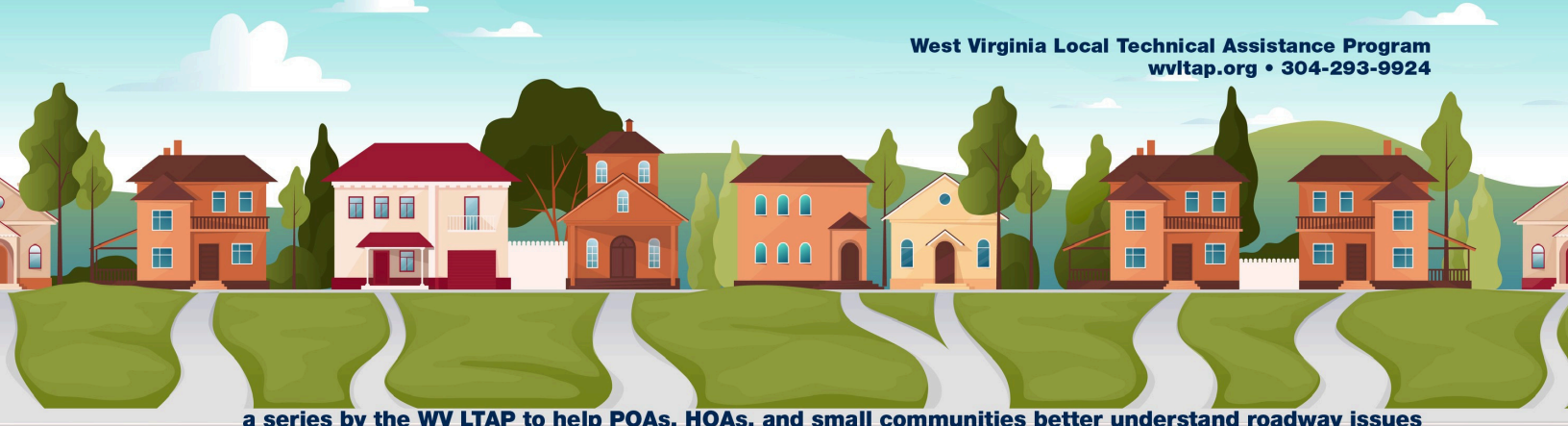

a series by the WV LTAP to help POAs, HOAs, and small communities better understand roadway issues

KNOW YOUR ROADS

May 2026

Keep Roads Strong, Move Water Along

The trouble in a puddle

Good road drainage is critical to the life of your roads. When water sits on the road surface, instead of moving off and away from the road, it can seep through cracks and wash away the soil underneath; this weakens the road's foundation and makes it more likely to break apart.

But it's not enough for water to just drain off the road surface. We also need to keep it moving away from the road. Water that puddles at the road's edge, due to high grass, stone, or other conditions, can gradually soak under the edge of the road and cause erosion. Over time, this can lead to road edges breaking away or road shoulders collapsing. Repairing the damage from poor drainage is often expensive. Fortunately, there are several strategies that help protect roads and keep water moving in the right direction.

Get water off of the road surface

One of the most important parts of drainage is the road surface itself. Roads should generally have a crown, which means the center of the road is slightly higher than the edges. This helps stormwater run off the surface instead of pooling on the road. A gentle slope away from the peak of the crown (~ 1/4 inch per foot across a paved road or 1/2 to 3/4 inch per foot across a gravel road) is recommended to get water flowing efficiently (see figure 1 on page 4). Keeping the road surface smooth and compact also helps prevent water from soaking in and causing potholes or erosion. For gravel roads, the surface requires regular resurfacing. This process includes loosening the top layer, reshaping the crown, and using a roller to compact it down.

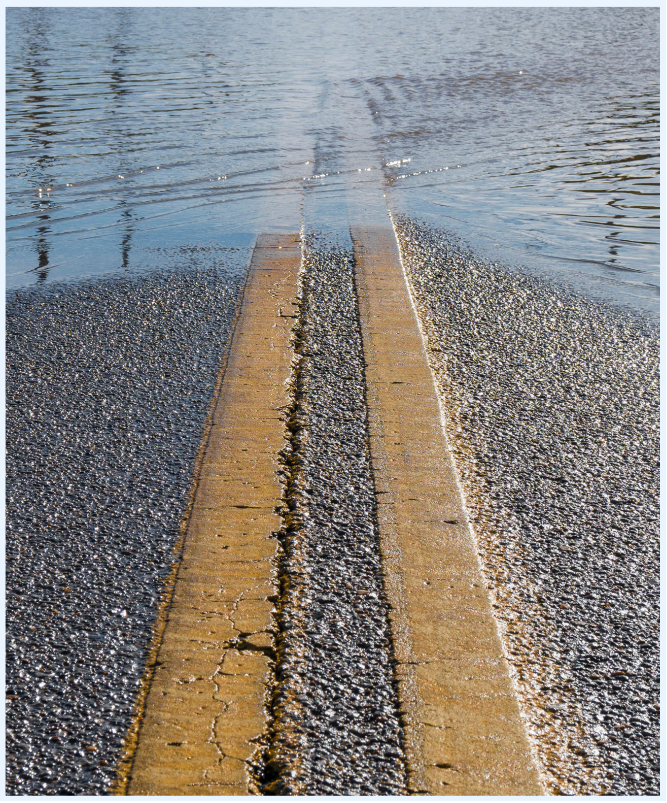

Photo by Canva - Water is pooling on the road surface.

Photo by the FHWA "Gravel Roads Construction & Maintenance Guide"

If much of the stone has been displaced into the ditches since the last resurfacing, it may need moved back onto the road. New stone may also be added before reshaping and compacting to address low spots or thinning of the stone layer that has developed over time. Paved roads should be regularly inspected for cracks, potholes, and surface irregularities that allow water to collect and soak into the pavement. Addressing these surface issues early helps prolong the pavement's life and improve road safety. Seal cracks and fill potholes as those distresses are noticed. Crown issues on paved roads are more challenging and can often only be rectified when the road is repaved. If your road has crown issues, it is even more important to address cracks and potholes, and communicate your crown needs to the paver when the time comes.

Move water away from the road

Shoulders, drainage ditches, culverts, and catch basins all work together to move water safely away from roads (see figure 2 on page 5).

Shoulders

Shoulders are the ground immediately adjacent to the road. Shoulders should be flush with or lower than the pavement and slope away from the road. They should be kept free of anything that slows the water down, such as tall grass.

Ditches

Ditches run alongside the road and carry runoff to nearby streams or drainage systems. To work properly, ditches need to be large enough to carry the water flow. Ideally, they should also be at least six inches below the subgrade, which is the layer of soil that supports the road base. Ditches may need reshaping if erosion alters their form. Regular maintenance in and around ditches, such as clearing debris or mowing and weed-eating overgrown vegetation, also increases their capacity to carry water. This helps prevent pooling and allows water to continue flowing away from the road effectively.

Culverts

Culverts are pipes used to direct water beneath an obstruction, such as roadways, buildings, parking lots, etc. Culverts are most commonly used to allow water to travel from a roadside ditch to the other side of the road. When water can't properly drain through a culvert—often due to a blockage—it can begin to collect and pool around the structure. This buildup creates pressure against the outside of the culvert that can bend, crack, or even collapse it. Metal culverts may corrode or deform, while concrete or plastic ones can shift or fracture. It's important to regularly check culverts for damage or blockages, especially before or after heavy rain. Clogged culverts can be cleared by removing leaves, sticks, and other debris from the

opening. A shovel, rake, or specialized plumbing rod can help pull out or break up sediment and compacted debris inside the culvert.

Photo by Canva - Catch basin with a sump collecting grass.

Catch Basins

Catch basins are used in areas where stormwater is managed underground. They help gather surface water and move it into underground storm sewers. The drain inlet of the catch basin is often a grate covered opening seen along curbs or in low-lying spots where water tends to collect. A sump is a lower chamber inside the catch basin that is designed to catch things like leaves, dirt, and trash before they can wash into the pipes and cause clogs. Catch basins require regular maintenance to operate properly; drain inlets need cleared to allow water to enter the system, and sumps should be emptied to keep the storm sewer from clogging. Regular inspections of drainage features are critical. Roads, shoulders, ditches, culverts, and catch basins should be checked regularly. Leaves, dirt, and grass clippings can build up and block the flow of water. Potholes and cracks can trap water. Addressing these problems early helps prevent bigger failures, reduces long-term repair costs, and improves driver conditions.

The WV LTAP can provide additional technical resources on drainage, including in-person technical assistance. Contact Andrew at Andrew.Morgan@mail.wvu.edu.

Did you know?

Drivers depend on drainage

Pooling water on the road surface can negatively impact motorists.

- At just 35 miles per hour, a car can hydroplane on standing water, making it difficult to control.
- In colder months, water can freeze and form icy, slippery patches.
- Clogged culverts are one of the top causes of sudden road washouts.
- Water on the pavement creates glare from headlights, reducing visibility.
- Saturated gravel loses up to half its strength, making vehicles more prone to sliding, fishtailing, or rutting.

Photo by Canva - Car driving through standing water on road.

Figure 1: Standard Roadway Slopes and Drainage Design