Basic Roadway Drainage Maintenance

UF | University of Florida Transportation Institute

Florida Transportation Technology Transfer (T2) Center

UNIVERSITY of FLORIDA

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Current Partnerships

- Auburn University
- University of Kentucky
- University of Tennessee

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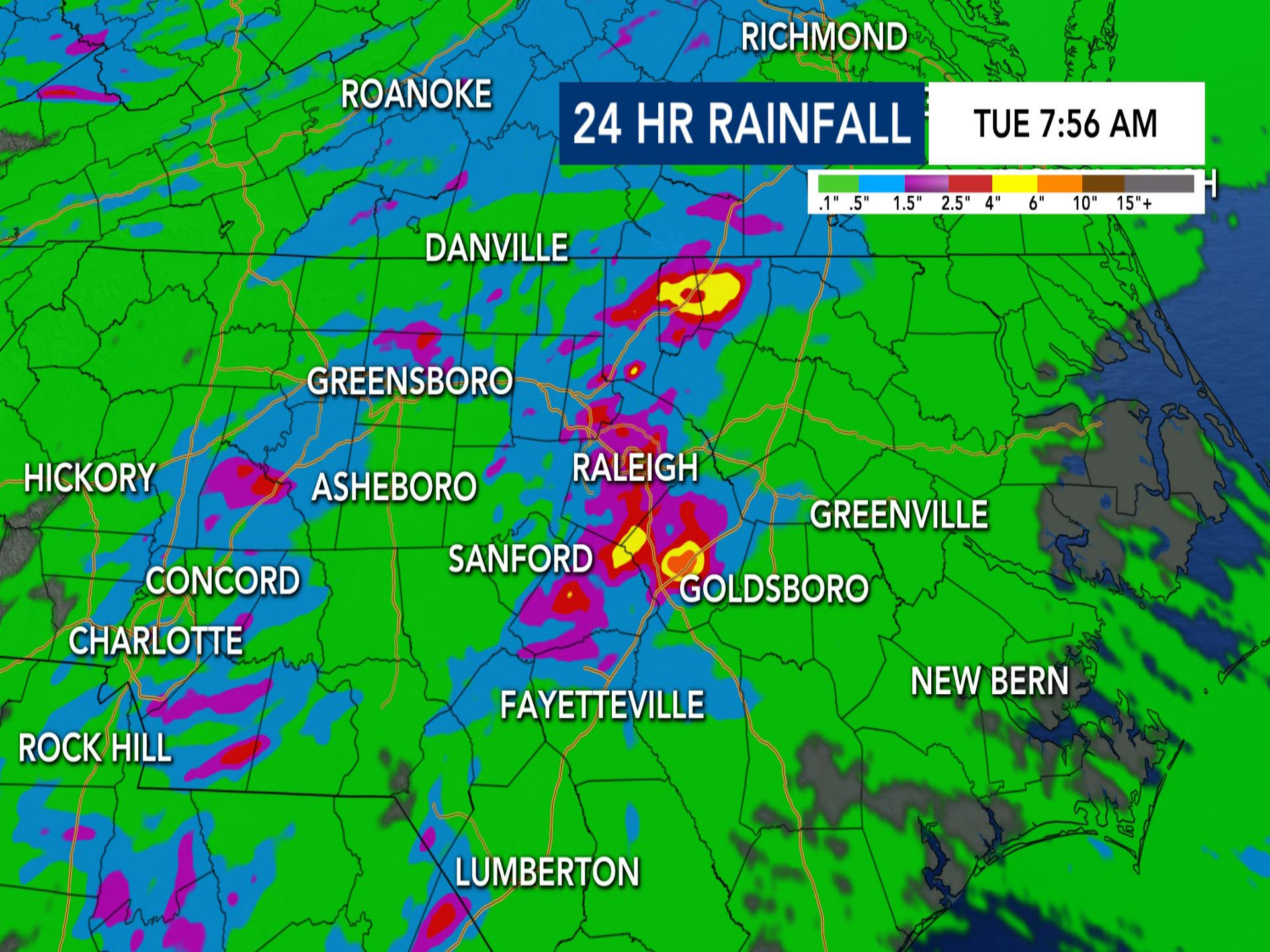
Dumb and Dummer


RICHMOND
ROANOKE
24 HR RAINFALL
TUE 7:56 AM
.1" .5" 1.5" 2.5" 4" 6" 10" 15"+
DANVILLE
GREENSBORO
HICKORY
ASHEBORO
RALEIGH
GREENVILLE
SANFORD
CONCORD
GOLDSBORO
CHARLOTTE
NEW BERN
FAYETTEVILLE
ROCK HILL
LUMBERTON


105
104

Roadway Drainage Maintenance

Drainage, Drainage, Drainage

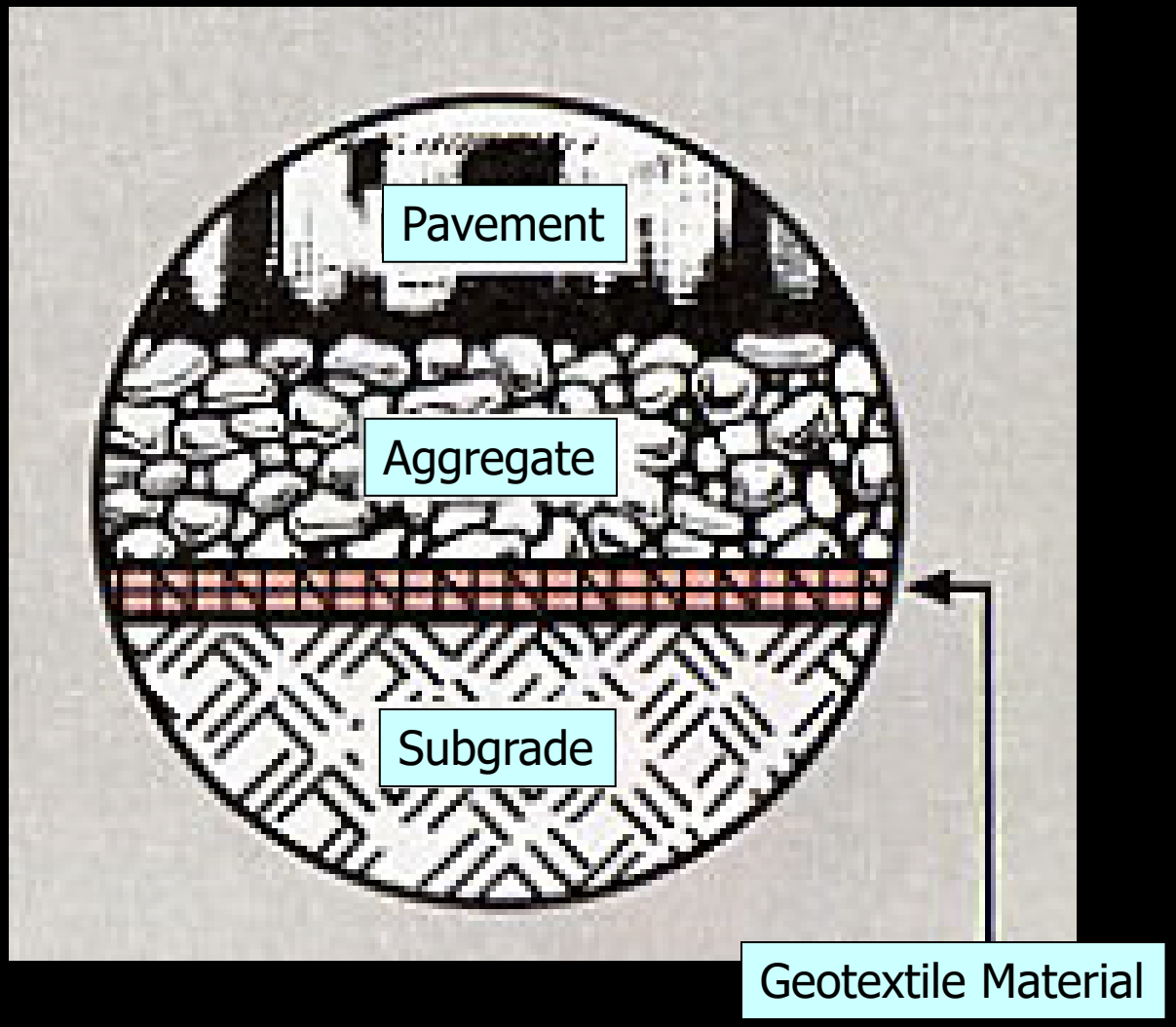
To prevent drainage problems,
remember that water

- flows downhill,
- needs to flow somewhere and
- is a problem if it is not flowing

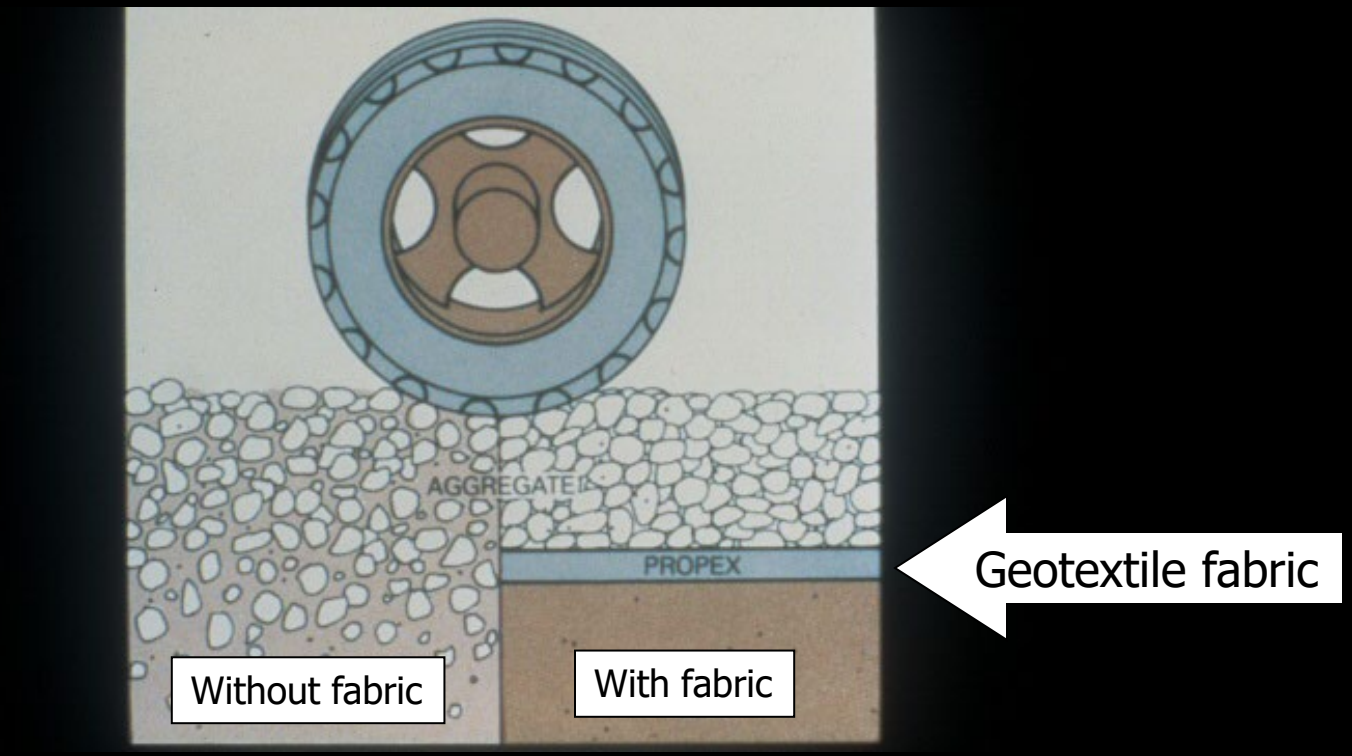
The 7 Basics of a Good Road

- Get water away from road
- Build on a firm foundation
- Use the best materials
- Compact all layers properly
- Design for maintenance
- Design for traffic loads and volumes
- Protect your investment (Maintenance)

Geotextiles



Geotextiles



Separation of layers of soil

Why is Water Bad for a Road?

Public Enemy No. 1

Poor Drainage Causes

Poor Drainage Causes

Pavement Failure

Poor Drainage Causes

Pavement Failure

Poor Drainage Causes

Water does not enter inlet causing erosion

Poor Drainage Causes

Water penetrates area before inlet

Poor Drainage Causes

Slope failures

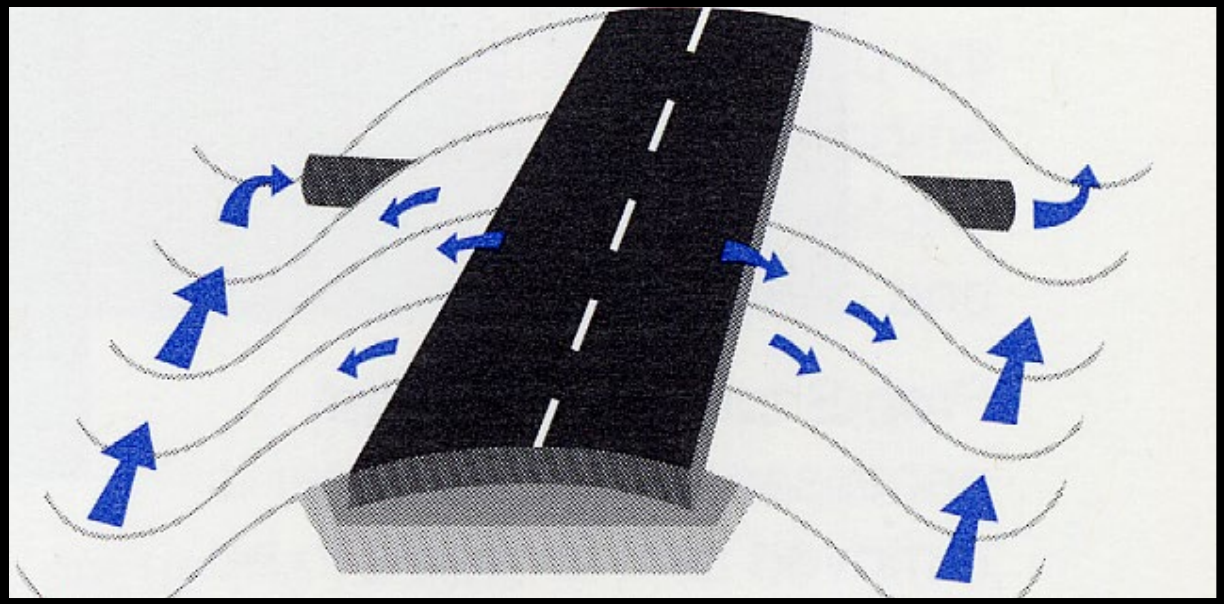
Poor Drainage Causes

Slope failures

Poor Drainage Causes

Slope failure repair costs

Draining the Roadway



<u>Ways to protect roadway structure</u>

- Seal cracks
- Proper patching
- Proper sloped shoulder, ditches and pipes
- Prevent erosion, scouring
- Clean, unrestricted pipes/culverts

Drainage Components

Uncracked pavement surface

Drainage Components

Pour cracks to prevent water infiltration

Drainage Components

Proper patches

Drainage Components

Good patches

Drainage Components

Water-resistant shoulder

Drainage Components

Shoulder needs proper slope

Drainage Components

Drainage Components

Curb and gutter

Drainage Components

Gutter Blocked

Drainage Components

Inlet working properly

Drainage Components

Shopping center entrance

Drainage Components

These drainage components work together to form a system. If any part of this system breaks down, the road will start to deteriorate.

Drainage as a System

- Design Policy
- Proper Construction Standards
- Maintenance Procedures

Design, proper construction and maintenance are all fundamental to good roadway drainage.

It is estimated that every $1 spent on roadway drainage will save $4 in overall maintenance.

Maintenance

Maintenance

Maintenance

Standing water around an island

Maintenance

Reseeded shoulder

Worker Safety

Worker Safety

"Drive Carefully My Daddy Works Here"

Worker Safety

Worker Safety

Flagger Alert

Worker Safety

- Proper Work Zone Traffic Control
- Trenching operation techniques
- Escape route
- Avoid walking under loads
- Crushing hazards, pinch points
- Loose material, tripping hazards, etc.
- Confined space requirements

What You See	What It Means	What You Should Do
Alligator Cracking	The Subbase/Subgrade is soaked and has been for a long time. Trucks are too heavy for the road to carry.	Regrade Shoulders, deepen and clean ditches. Regrade ditch, install interceptor drains, if economical. Keep roads passable with minimum maintenance and schedule re-construction.
Scour at Inlet	The ditch grade is too steep. Poor location/alignment. Clogged Pipe	Riprap to deflect water. Realign and clean.

What You See	What It Means	What You Should Do
Scour at Outlet	Too much grade. Pipe to small. Pipe in poor condition.	Build a stone energy dissipater. Schedule for replacement.
Washouts Along Edge of Road	Substandard Shoulder Maintenance.	Grade out secondary ditches. Bring low shoulders up to the grade of the pavement.

What You See	What It Means	What You Should Do
Erosion of Slopes and Ditches.	Too much water concentrated in an area. Flow is too fast for the channel lining.	Inspect and clean culverts regularly. Line ditches and revegetate.
Reduced Culvert Outlet Flow	Clogged pipe. Broken joints. Collapsed pipe.	Inspect pipe and clean. Repair or replace as necessary.

Questions

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