

## Section 6: Roads

Roads may be a long-term source of sediment and erosion problems if not properly managed. This section has tips for planning, constructing and maintaining roads.

### FPG

*There are several FPGs, buffer rules, wetland rules, guidance and information documents that specify how and where you may (or may not) build forest roads.*

### RULE

- Read and understand the rules that may apply to your site. Seek assistance if you are in doubt.
- Refer to the *North Carolina Forestry Best Management Practices Manual To Protect Water Quality* for detailed recommendations and further rules descriptions.
- Additional tips for permanent forest access roads are provided in *The Layman's Guide to Private Access Road Construction in the Southern Appalachian Mountains. Second Edition, 2005*. This guide is available from N.C. Forest Service offices and its Web site: [www.dfr.state.nc.us](http://www.dfr.state.nc.us)
- Forest roads in wetlands require more precise and careful attention, as well as compliance with several regulations. Refer to the “Water Quality Regulations, Laws and Guidelines” section of this field guide for further information.

## Planning Roads

- Limit the number, size, area and length of roads.
- **FPG RULE** Keep roads out of the SMZ unless absolutely necessary. Refer to the rule citations.
- **FPG RULE** Avoid stream crossings. If a crossing is needed, minimize the amount of soil disturbance at the crossing. Refer to the rule citations.
- Locate roads away from streams, ponds, or lakes when possible.
- Minimize placement of roads within ephemerals.
- Situate roads atop stable, dry and well-drained soil. Soil surveys are a good source of soils information.
- Build the road in advance of when it is needed, to allow time for the roadbed to settle and firm up.
- In steep terrain, situate roads along mid-slope contours (below the ridgeline) so you can turn away the runoff and more successfully control it.



*Broad-based dips are used to control runoff (arrows). Silt fences help capture sediment at the outlet of each dip. Gravel allows good drainage. Road corridor is daylighted.*



*This road needs rehab work to stop erosion gullies from carrying sediment to the stream. Broad-based dips, turnouts and groundcover vegetation can help.*

## Constructing Roads

- Keep mud and soil off of public roads so sediment does not wash into streams or creeks.
- Keep grade slopes to 10% or less. If steeper sections are needed, restrict unbroken grades to 200 feet.
- Install frequent breaks in the grade to divide long stretches of road into shorter more manageable sections to control runoff. Examples of how to do this include switchbacks, curves and broad-based dips.
- For side/cut (slope) banks, create the slope-angle gradual enough so the soil remains stable and can be re-vegetated.
- Grade the road surface to control runoff, according to site conditions and traffic needs. This may include outsloping, insloping and/or crowning (see sketch figure on next page).
- When on soft soils, consider building the road atop geotextile (fabric) to keep surface stone from compressing into the soil. Geotextile (fabric) also works well at stream crossings if they are needed.
- Install erosion control structures or devices to control runoff from the road surface.
- Minimize heavy equipment usage in the stream channel when installing and removing crossings.

# Cross-section sketch of road surface options

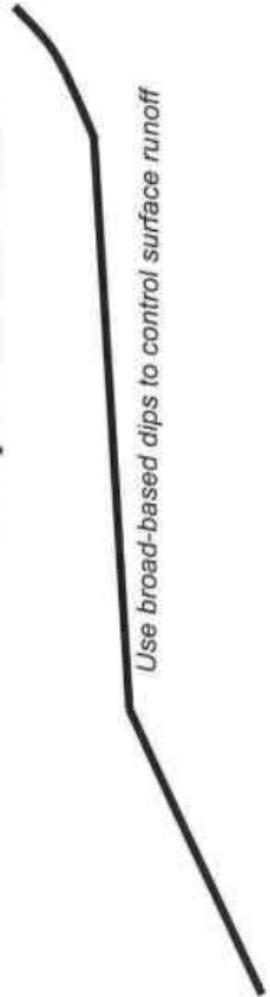
Crowned Road Cross-Section



Insloped Road Cross-Section



Outsloped Road Cross-Section



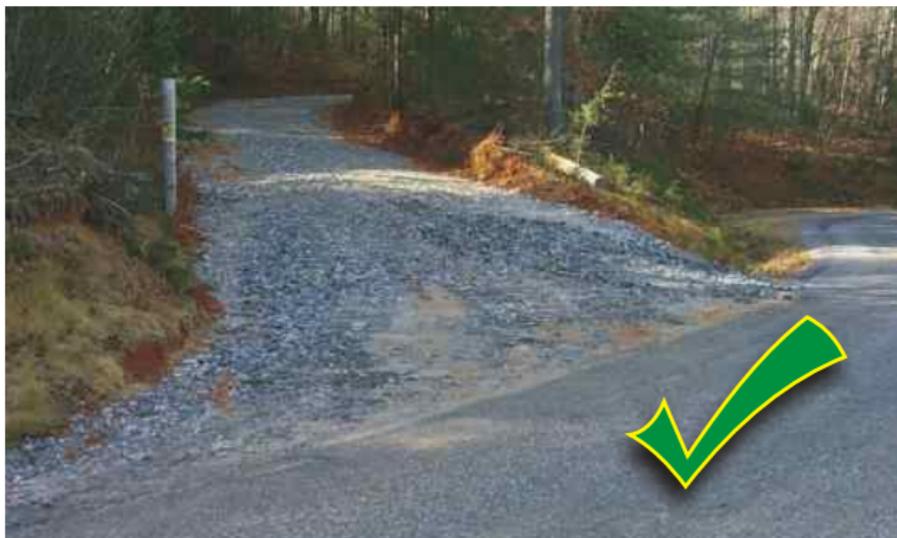
# Roads



**Road under construction:** Geotextile sheeting is used as a base for this road on slick clay soil. Road curves up the slope, not directly up and down. Curving the road allows improved runoff control. Surface stone and groundcover vegetation are still needed to finish the job.



**Don't skimp on gravel for permanent roads.** An ample layer of gravel promotes surface drainage, runoff control and year-round vehicle access.



*Gravel is applied well back from this public road entrance to remove soil from the truck tires.*



*Mud and soil is being dragged onto the public highway. This could be a safety hazard and the soil may wash into a nearby stream after a rain.*



*Wooden road pallet mats are used to create a travel surface for log trucks. Mats help to keep mud, soil and debris off public roads. They also provide a stable, firm platform for log trucks, reducing wear and tear.*

## Maintaining Roads

- Establish and/or maintain groundcover.
- Maintain an open corridor along the roadway to allow sunlight to dry the road surface. This is what is meant by “daylighting” the road.
- Keep the road surface graded and/or stabilized to control surface runoff and promote drainage.
- Monitor erosion control structures for excessive sediment buildup. Remove sediment as needed to maintain the structure's function.
- Close out roads that are no longer being used as soon as possible. Control access to limit unnecessary traffic.

**X** *Minimize use of the road when wet.*



*Road needs “daylighting” so sun can dry out the road.*

# Roads



*Road structure is crowned for drainage of runoff. Surface is stabilized with stone and grass. Road corridor is "daylighted".*



*Road has poor surface drainage. Erosion gullies are forming. Erosion control structures, surfacing materials and/or groundcover vegetation are needed.*



*Surface is stabilized with stone. Road shoulders have vegetation. Road grade is minimized. Runoff is controlled. Road corridor is “daylighted.”*



*Uncontrolled runoff is gully out this road. Erosion control structures and surface stabilization can help. If the road is not needed, close it. Groundcover is needed.*



*Excellent groundcover vegetation on the roadway surface and the adjoining slope bank. The road corridor is “daylighted” for good drying. To establish vegetation on crusty, bare mineral soil, you may need to break up the hard soil surface and apply lime and fertilizer. A soil test analysis can determine liming and fertilizer needs.*

## Tips for Roads in Wetlands

- Limit the road size, width, length and total area to the minimum that is needed.
- Keep the roadbed height as close to the original ground level as possible.
- Install enough cross-drainage through the roadbed to prevent blocking the flow of surface waters.
- If borrow ditches are needed:
  - Do not tie-in these ditches to existing channels.
  - Place excavated material atop the road surface or remove it to an upland location out of the wetland.
- Stabilize and close the road as soon as possible.
  - ✗ ***Avoid blocking the flow of surface water.***
  - ✗ ***Never do any work that converts a wetland site to a non-wetland site.***

**Remember:** *For specific information about roads in wetlands, refer to the document from the U.S. Army Corps of Engineers entitled: Information Regarding Compliance with the Federal Clean Water Act Section 404(f)(1) Provisions for the Construction of Forest Roads Within Wetlands, in North Carolina. This information document is in the forestry BMP manual.*

**FPG RULE** *Refer to the regulations for roads in wetlands referenced at the back of this guide.*

# Roads



*Multiple culverts in swampy or lowland areas will allow water to pass through without blowing out the road.*



*There is no defined channel here, just a lowland area. Mats and stone may need to be removed after completion, in order to prevent blockage of water flow in the future.*