

Some  
Natural Controls  
Which Affect Road Locations

Control	Comment
Saddles	Major control for road location.
Ridges	Major control and often a satisfactory road site.
Stream Crossings	Locations wide enough to accommodate the road. Good site for bridges or fills and culverts as needed. Evaluate for migratory fish where needed. (See Tables 2.4-7,8).
Benches	Often a good location for road, junctions, switch backs, landings, etc.
Cliffs or Rock outcrops	Cross above or below at a safe location. Rippable rock is less costly than hard rock needing blasting to remove.
Slides	Avoid or cross at the safest point.
Bogs, swamps, wet meadows	Avoid where possible or cross quickly at best point.
Valley Wide	Low gradient-desirable road location if above the flood line. Little excavation. Skirt meadows' edges to avoid resource damage.
Narrow	Poor location because of flooding, pollution potential, and high costs to cross the stream when it meanders. Grade gentle and excavation low.
Slopes Greater than 40% but less than 60%	Avoid sliver fills which have large areas exposed to erosion. Sediment may be difficult to control because of long buffers needed.
Greater than or equal to 60%	In slide areas, midslope roadways are not recommended. End haul of material and full bench needed if site must be used. A safe repository for material is needed. Proceed only with extreme caution. Avoid if possible.
Ridge Crest	Good alignment and little excavation, drainage good--few culverts; adverse grade on uneven ridges common. Spur roads are adverse grade.
Other	Stream crossings done mostly with culverts and fills. Flood hazard no problem--pollution little or none if proper buffers and other precautions taken. Alignment often poor and grade steep.
Aspect	Maintenance problems may be avoided in moist climates by placing the road on the south face to promote drying. In dry areas the north face holds more vegetation--has less erosion. Extremely wet or dry climates wash out this effect.
Climate	The 10 to 15 inch annual rainfall zone is the most erosive. When possible, place road above or below this area. Take extra care if the facility is in this zone.
Rock Slope (dip)	Place road on the hillside where rock dips inward. Consult geologists for other problems.
Soils	Where possible, avoid naturally erodable soils. Check soils maps for any problems. Ask soils scientists for help. Frozen soils require special care as does tundra.

Some  
Man-Made Controls  
Which Affect Road Locations

Control	Comment
Legal	Boundary lines limit the location of a road. Cross other land only with a written right-of-way agreement.
Specific Location	Usually beginning and end points of a road are fixed. Additional locations to be reached might be certain timber stands, recreation sites, buildings, etc.
Safety	Each class of road and use level requires specific safety requirements. Some may be mandatory by law. Common sense sets others. The usual ones are speed, grade percent, curve radius, sight distance, and turnouts or turnarounds. See discussion in Table 1.6-1 Suggested minimum standards.
Pollution Control	Roads should avoid problems. Give ample room to trap sediment in a buffer before it reaches a stream. Stay out of the flood plain, slides, erosive soils, etc. Leave room for mitigating measures. Avoid slopes over 40%.
Design Elements	Physical limits for curve radius, road grade, pitch grade stopping distance, and distance from a functioning stream are set by men.
NOTE: Definitions of terms limit or expand man-made controls.	
Migrating Fish Factors	Observe ideal buffers. Know what species are using the stream and what their limits are. Plan to accommodate the migratory fish 95 percent of the time. See Tables 2.4-7,8 for more details.
Approach Road Permits	Issued by State or County authorities for connecting road to public highway. Locations may be restricted by safety considerations for public road users.