

Helping Communities face the challenge and impacts of growth while maintaining community character and a sense of place.

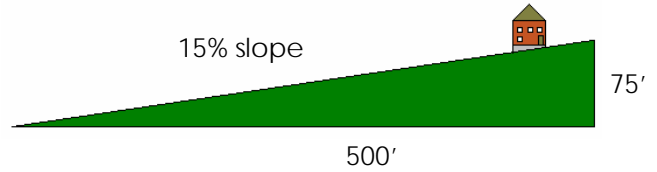
FACT SHEET: 12

Steep Slopes

iTRaC is the Nashua Regional Planning Commission's new approach to community planning that focuses on integrating transportation, land use and environmental planning. The program was developed to assist communities in dealing with the challenges of growth in a coordinated way that sustains community character and a sense of place.

Steep slopes are legally defined as hillsides having a 15 foot, or greater, vertical rise over 100 feet of horizontal run, or 15% slope (Figure 1). They are often undesirable areas for development due to the difficulty of building on steep grades. On the other hand, these slopes can provide wildlife habitat, recreational opportunities, and scenic views, preserving the unique and culturally valuable environmental qualities that people treasure in New Hampshire.

Figure 1: Example of a 15% slope



Steep slopes have a ≥ 15 ft vertical rise over a 100 ft horizontal run, or a 15% slope.

Difficulties Developing Steep Slopes

Erosion ~ The loss of vegetation and disruption of natural drainage patterns brought about by development on steep slopes can cause erosion problems leading to potential flooding, stream sedimentation, and slope instability.

Infrastructure ~ Providing infrastructure to hillside development can be expensive to engineer and construct. The typically shallow, poor-draining soils on slopes are not suitable for septic systems. High failure rates of septic systems on steep slopes are a serious threat to ground and surface water quality.

Road construction ~ NH DOT & municipalities regulate the gradient of roads, common driveways, and sometimes private driveways. When building on steep slopes, switchbacks & extensive regrading are required to assure motorist safety.

Strategies for Developing Steep Slopes

Vegetation can stabilize soil and prevent erosion on steep slopes by binding loose soil with roots and slowing the passage of water down the slope. Replanting disturbed locations after construction with a combination of trees, shrubs, and groundcover is key.

Berms are long earthen mounds running perpendicular to the fall line of the slope. They slow runoff so it can be absorbed into the soil instead of washing away and are less expensive than retaining walls (Figure 2).

Retaining walls also help to hold unstable slopes. A series of natural retaining walls can form terraces down the hillside, creating more useable space on the slope.



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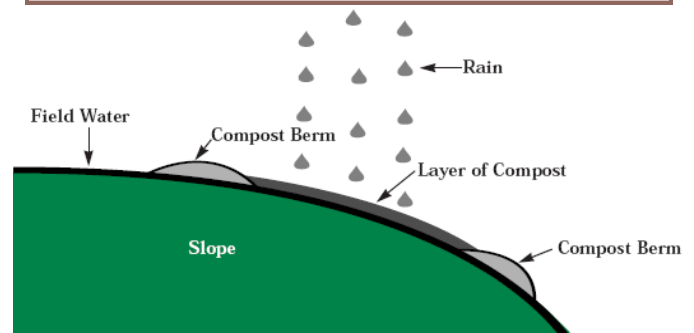


Figure 2: Berms help to slow runoff from steep slopes. Source: *Innovative Uses of Compost: Erosion Control, Turf Remediation and Landscaping*. Environmental Protection Agency, Oct 1997

Regulating Steep Slopes

Since the 1950's, when steep slope ordinances were first adopted, 3 methods have emerged as the most effective in regulating development:

Slope/Density Ratio

The Slope/Density Ratio bases the allowable density of development on the steepness of the grade to effectively reduce the intensity of development as the slope increases. The cap is generally 25%, when slopes become too steep for safe and cost-effective development.

Soil Overlay

This method uses soil maps provided by the Natural Resource Conservation Service to determine which slopes can safely support development based on the stability, depth, and type of soils found in a given location. For more info visit: soils.usda.gov.

Overlay Districts

A hillside overlay district, similar to the more familiar wetlands overlay district, can provide a set of guiding principles for all future hillside development within a jurisdiction. These regulations are often flexible and can be tailored to specific projects and slopes.

Enabling legislation authorizing communities to regulate slope development is found under RSA 674:16—Grant of Power; RSA 674:21—Innovative Land Use Controls; and 674:21.I(j)—Environmental Characteristics Zoning. As of 2006, 27 NH municipalities had implemented some form of steep slope regulations.

In order to develop the most effective steep slope regulations, 10 criteria should be considered including: topography, slope stability, drainage and erosion, infrastructure, access, aesthetics, natural qualities, fire risks, recreation opportunities, and open space. These ten criteria can be used as a framework to build a solid justification for regulating steep slopes, hillsides, and ridgelines. For more information on these topics and how to regulate development on steep slopes consult *Planning for Hillside Development* by Robert Olshansky (available at: www.planning.org/APAStore).

Top 10 Steep Slopes Criteria

1. Topography
2. Slope stability
3. Drainage & erosion
4. Infrastructure
5. Access
6. Aesthetics
7. Natural qualities
8. Fire risks
9. Recreation opportunities
10. Open space

Steep Slopes Enabling Legislation

RSA 674:16 Grant of Power
RSA 674:21 Innovative Land Use Controls
RSA 674:21.I(j) Environmental Characteristics Zoning

Protecting Steep Slopes

One way to keep development off of steep slopes is to protect them. Steep slopes can be valuable community resources for recreation and wildlife habitat. Possible mechanisms for steep slope protection include creating greenways, wildlife habitat preservation areas, and conservation areas.

Sample language and a model steep slopes ordinance prepared by the NH Department of Environmental Services can be found online at: www.des.nh.gov/REPP/ilupth/Steep_Slopes.doc

Don't let this happen to you...



Source: Center for Coastal Studies, University of California, Santa Cruz

For more details visit www.nashuarpc.org/itrac. There you will find fact sheets, resource cards, and helpful links for a variety of planning topics as well as our lending library, training schedules and materials, best practices guidelines, frequently asked questions, and much more. You may also contact Camille Pattison, iTRaC Program Manager, at camillep@nashuarpc.org or 603-883-0366 x14.

