11. **SITE PLANNING THAT RESPECTS TERRAIN**

Nestled in the Blue Ridge Mountains, Albemarle County is blessed with mountains, streams and valleys that provide spectacular views and make it a place of beauty and tranquility. In the Development Areas, those same mountains, streams, and valleys provide character but also present significant challenges for development. The following recommendations are offered for building on slopes in the Development Areas:

**Building on Slopes**

**On slopes of 0 - 10%:**
- Most building can occur easily without major regrading
- On Cottage Lots (40 feet wide) and smaller, retaining walls may be necessary with grades above 7%
- The lower slope gradations can accommodate wider roads and boulevards

**On slopes of 10 - 15%:**
- Moderate grading may be needed to support development
- On Village Lots (60 feet wide) and smaller, retaining walls may be necessary at grades above 10%
- The moderate slope gradation can accommodate mostly narrow and some wider roads

**On slopes 15 - 25%:**
- More care with grading is needed so that extremely steep slopes are not created by regrading

- An open space buffer can be created between the edge of a neighborhood as seen from perimeter streets to absorb some of the grade

**On slopes 25% and greater:**
- Extreme care should be taken when building on slopes of 25% so slopes that are even steeper than 25% are not created
- Development on steep slopes should be considered with regard to its impacts on significant systems of slopes as identified on the County’s Open Space Plan and the Master Plan for the Development Area
- Development on steep slopes should either take place at the low end of the density range, or buildings should be of sufficient size and configuration to take up the slopes.
- Viewshed impacts should be considered when designing buildings on steep slopes

The County recognizes that not all steep slopes should be preserved from development in the Development Areas. Significant features identified for preservation in the Open Space Plan, as well as other environmentally sensitive areas, should be mapped during the Master Planning process. As described in Section 4, the first map created should identify particular areas of steep slopes, forested land, streams, and stream valleys to be preserved to enhance the quality of life in the Development Areas.

Steeply sloped areas, vegetated lands, and stream valleys that are of less significance to the character and quality of life in the Development Areas will be identified during the Master Plan process and made available for development. It is
the grading and reconstruction of the slopes that affect neighborhood and environmental quality, such as the health of streams. Simply put, reconstructed slopes should be stable, safe, easily vegetated (where vegetation is used instead of retaining walls) easily maintained, and attractive. The following approaches are offered for reconstruction of slopes:

**Design Suggestions for Grading and Reconstructing Slopes**

- “Feather” cut-and-fill slopes back into existing grades to create a smooth and natural appearance.
- When reconstructing slopes, minimize use of 2:1 slopes. Opt for 3:1 slopes and 4:1 slopes that are easier to walk on, easier to establish and maintain with vegetation, easier to accommodate steps, and which are more visually pleasing. On residential streets, 2:1 slopes at the edge of front yards may be necessary in order to achieve the front yard conditions outlined earlier in this section. Such slopes should be heavily landscaped for visual quality and ease of maintenance.
- Break up expanses of slope through “benching” and changes in vegetation.
- Where 2:1 slopes cannot be avoided, use them sparingly and plant vegetative material that is easy to establish and maintain. Grass should not be used as the primary vegetative cover on 2:1 slopes because of the difficulties and dangers of mowing these steep slopes.
- Where “feathered” grading would result in extra site disruption and destruction of existing vegetative cover, small retaining walls on stepped terraces are preferable to unnaturally steep slopes.
- Where retaining walls are used, generally they should be small and benched rather than large and imposing. Where retaining walls front a public street or sidewalk the material with which they are faced assumes great significance.
- Pay attention to safety when regrading slopes. Regrading from a property line that creates a steep slope can be hazardous for a neighboring property owner.

- Safety fences should be provided where retaining walls are greater than 4 feet in height.
- Be careful when adding a fence to the top of a retaining wall. It will look even taller than it is and a smaller more benched wall may be more appropriate. To avoid height inconsistencies and promote safety, which is essential when using of retaining walls, consider putting a freestanding fence inside a retaining wall. Use planters as decorative walls and break up retaining walls with small benched sections.

**Grading Suggestions for Steep Slopes and Drainage**

Drainage is a key problem when building on and reconstructing slopes. The following suggestions are offered to help minimize drainage problems:

- Diversion is the key to successful slope drainage and stable grading. Surface runoff must be intercepted and diverted.
- Swales or trench drains should be used at the top of such slopes to divert drainage around any buildings downhill.
- Attention should be paid to material used to break up flow in drainage ditches. Rip-rap solutions, although practical, can be unattractive and hazardous to pedestrians and playing children. Other options including using biofilters and lining. Paving can be used but is often unattractive. It is better to mimic natural slopes and channels so that rip-rap, concrete, and liners are not necessary.
- Properly planned and installed drainage structures should be used to avoid “gullying” and drainage problems to downhill properties.
- Major fills are engineered structures and should be treated as such. Diversion swales should be included at the head and toe of all regraded slopes to avoid “slumping.”
- Correct shaping and placement of cut-and-fill volumes is critical to avoid slippage.
- Low fills should be placed in separate benched areas.
- High fills should have both an interception gutter at their head and a heel drain with the top of the fill pitched gently back towards the interception gutter.
Design Suggestions for Retaining Vegetation

- Where grading is required, preserve mature native vegetation wherever possible
- Treat native vegetation as a design and marketing asset
- Protect it from compaction or injury during construction
- Retain native vegetation to blend new development into the site and limit erosion, slipping, and runoff from the site

Where slopes are greater than 12-15% 

- Place roads parallel to the contours
- Parallel roads require extensive grading but allow easy access to units and open views outward.
- Although parallel roads make lot development easier, they tend to be less interesting visually because they minimize the effect of rolling terrain on creating character and diversity within a neighborhood.
- Use of retaining walls may be required at front yards and at rear alleys which diminishes opportunities for neighbor to neighbor interaction
- Roads parallel to the contours can be longer which causes more disturbance
- Parallel roads can cause access problems if used on too steep of terrain

Suggested ways of developing Streets, Roads, and Lots on Steep Terrain

The following recommendations are made for constructing roads on sloping terrain:

- Roads should be as narrow as is functionally acceptable.
- In the steepest conditions, placing houses only on the inside of the outermost streets allows residences to front the roads along the edges of Neighborhoods.

Roads placed perpendicular to the contours

- Roads perpendicular to the contours can minimize the amount of grading needed but can cause difficult access problems and limit views
- These roads tend to have considerable character as houses step up the hill
- While retaining walls may be required between adjacent houses in this model, social interaction across streets and alleys is considerably easier than along streets running parallel to the terrain
- Use of these roads requires more flexibility in housing types and locations of garages
Design Suggestions for Ends of roads on steeply sloping land

- Greens and Closes should provide end treatments for streets on steeply sloping land
- Closes should always be linked laterally at the earliest opportunity (See Figure 6:47)

Design Suggestions for Road Profiles

- As steeply sloping land should support low-density development, a rural profile may be appropriate for roadways in such areas.
- The rural profile roadway provides for grass infiltration swales. This profile, however, cannot be too steep; otherwise, the swale will lose its infiltration properties.

Design Suggestions for Building Siting on Steep Terrain

The following approaches to siting buildings on steep terrain are offered:

- Buildings should be sized and located to capitalize on views without negatively impacting views from afar.
- The crest of the hill and the top of the slope, sometimes referred to as a “military crest” may be used or created to preserve or enhance views (See Figure 6:115).
- When views are from below, extreme care should be taken to avoid breaking the crest of the hill with the tops of buildings
- If breaking the crest of the hill is unavoidable, retaining a screen of existing mature trees throughout the new development will help to obscure the view.
- Buildings should fit into the existing grade and step down the slope rather than mass grading for building and parking slabs.
- Building foundations can be used as retaining walls to further minimize environmental impacts
- Terraced parking lots, small-scale frontage buildings, and rooftop parking are all devices which may allow even a “big box” retailer to sit more comfortably on Albemarle County’s hilly terrain

Figure 6:114 A residential close provides for a neighborhood green while houses rest on the opposite side of the road overlooking the river valley.

Figure 6:115 A “military crest” at the top of the hill is left vacant; buildings are placed on the development side so that roofs are not visible to the other side.

Figure 6:116 These townhouses are stacked to better use the topography. “Uphill” units enter two stories above “downhill” units.
Figure 6:117 Section of typical site along arterial road in Albemarle County. Such sites are often developed with “big-box” retailers.

Figure 6:118 Section of typical site after conventional development with “big-box” retailers.

Figure 6:119 Section of typical site with “big box” retailer after alternative development corresponding to the Neighborhood Model and closely sited on sloping terrain. Cut and fill is minimized and buildings and their parking lots act to retain earth and absorb grade. Parking on the roof is an added expense for retail developers, but offers considerable grading benefits while reducing impervious surface and minimizing walking distance.

Figure 6:120 Section of site where building mass takes advantage of slope and provides structured parking for the use.

Figure 6:119 These garden apartments have been designed to use the topography to their advantage. They sit on the hill so as to allow parking underneath, in the back, and street level entry in the front. Image taken from Site Planning and Community Design for Great Neighborhoods by Frederick D. Jarvis.