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"Designing with Nature for People"

Specific Memo -- DRAFT

To: Signal Mountain Planning Commission

From: Randall Arendt

Date: April 3, 2007

Subject: Constructive Comments on the *Land Use and Transportation Plan*, the Zoning Ordinance, and Subdivision Regulations Regarding Greenspace Protection

As requested, I have reviewed the Town's *Land Use and Transportation Plan* and its zoning and subdivision ordinances from the perspective of a land-use planner who strives to blend conservation with new development in order to conserve interconnected networks of open space. However, because I am not an attorney, my recommendations should, of course, be reviewed by your legal counsel.

REGIONAL COMPREHENSIVE PLAN 2030

This document is very thorough and most commendable. It contains numerous policies concerning the environment and rural character, such as:

1. retain scenic beauty and diverse wildlife habitats
2. develop a Residential Conservation District of a contiguous greenbelt
3. preserve open space in rural areas
4. provide rural development options that cluster density while preserving...woodlands, hillsides, prime farmland, viewsheds...
5. formulate new zoning tools allowing higher density or small lot developments in exchange for preservation of substantial areas of open space (above quotes are from pages 75 and 113)

LAND USE AND TRANSPORTATION PLAN

By contrast, this more local document is surprisingly deficient and incomplete. Rather than being comprehensively written, it appears to focus lopsidedly on development, as evidenced in chapter headings such as "Development Policy Plan", "Development Plan", and "Development Goals". A plan that is supposedly broad-based, reflecting the full spectrum on interests in the community, would give equal (or almost equal) weight to the countervailing conservation objectives of community residents.

Although most such documents often go by the name of "Comprehensive Plan" (due to their more comprehensive nature), historically the local planning documents adopted by Connecticut towns were once known as the "Plan of Development". About a decade ago, however, the state legislature changed the enabling legislation to officially rename these documents as the "Plan of Conservation and Development". (This action was not unrelated to the publication of my first book -- *Dealing with Change in the CT River Valley: A Design Manual for Conservation and Development* -- which graphically illustrated exactly how those two seemingly conflicting goals could be blended through a technique that is now known as "conservation subdivision design".) The next time your Plan is updated, I suggest that the Town consider taking this more balanced approach.

Your current Plan appears to contain a seriously-below average amount of written information regarding natural and cultural features. As noted in the *General Memo*, it contains just one single map with information about natural resources. And that map -- called *Natural Constraints in Developing Areas* -- is one where the natural features are viewed as obstacles (to development), rather than as the invaluable resources they are in terms of the environment, air quality, water quality, wildlife habitat, scenic viewsheds, and the opportunities they represent for preserving community character.

This almost negative perception of natural resources is re-inforced by the very revealing title chosen for a chapter on those parts of town rich in such natural resources: *Vacant Land/Open Space* (emphasis added), as if were land just waiting to be filled up with more houselots and streets.

From this evidence, it appears that the philosophy of the community at the time this Plan was written was one which was focused almost entirely upon development. This is in marked contrast to the County's *2030 Comprehensive Plan*, which places far more weight -- in a truly balanced manner -- upon environmental resources.

The current Plan's policies and implementation measures could greatly benefit by being expanded and updated. Among the kinds of additional goals it might embrace are the following:

- to protect undeveloped lands through flexible land-use controls that would become the norm rather than the exception
- to use conservation design to locate houses and streets on the least productive farmland or the least significant woodland habitat; to locate septic sewage systems on soils best-suited for that purpose; and to provide for stormwater infiltration areas to recharge groundwater supplies

(rather than permitting the "catch-and-release-downstream" method of stormwater management)

- to amend other development regulations to specifically and effectively protect historic and cultural features, scenic viewsheds, and restore degraded landscapes

In addition, I would suggest considering the following changes:

-- limiting the creation of impervious or graded surfaces, specifically including limiting woodland clearance for lawns, though conservation subdivision design (which effectively enforces a "maximum lot size")

-- protecting key scenic resources and roadways, such as through a Scenic Road listing that creates a special category for roads where conservation design would be required; for example, "Rural Roads"

The *Plan* also misses several opportunities to further advance the thinking about creative zoning provisions and subdivision procedures for open space development design. Said another way, the *Plan* could have placed more emphasis on the potential of these techniques for becoming a major "form-giver" in shaping the patterns of new development. Reserving linked systems of conservation land protects community character much more effectively than do conventional regulations. I believe the *Plan's* recommendations in this chapter should be expanded upon to provide readers more details of specific kinds of refinements -- both substantive and procedural -- necessary to protect more open space during the development design process.

As an example of these shortcomings, the current *Plan* does not sufficiently advise readers that conservation design can be a major tool for protecting interconnected networks of open space and implementing key goals of the *Plan*, that land trusts can play an important role in preserving, owning, and maintaining conservation lands, that easements (rather than deed restrictions) are the much preferred way of protecting lands legally, and that the subdivision design and review process itself could benefit from an expanded *Context Map*, a more comprehensive *Existing Resources/Site Analysis Map*, a mandatory site visit by voting officials and staff, a tracing paper overlay sheet format for the *Sketch Plan*, and the four-step design process.

However, these short-comings can be easily rectified. The easiest way to accomplish this might be to add a special chapter on implementation, such as by including some of the wording contained in the "Model Comprehensive Plan Language" appendix appearing in my fourth book, *Growing Greener: Putting Conservation into Local Plans and Ordinances*. Such amendments would give the Town a firmer legal foundation for implementing the specific kinds of ordinance refinements described in this memo and in my "General Memo". The sections in that model Comprehensive Plan language which might be added to your *Land Use and Transportation Plan* describe a few items appropriate for your zoning ordinance and six items for your Subdivision Regulations. Many of these items refer to specific things the Town is not yet providing requirements or standards for (such as TDRs, landowner compacts, and

"traditional neighborhood design"), while other items relate to things that it is already doing, but which it could be doing better (a *Context Map*, site analysis plans, sketch plan overlay sheets, site visits, a prioritized list of natural features, conservation standards, etc.). It does no harm to augment the language in your existing *Land Use and Transportation Plan* and could help in several ways, making it easier to defend innovative improvements to your ordinances, and pointing the way toward even more creative approaches that are worth considering as future ordinance amendments.

As recommended in my "General Memo", another critical element of an updated plan would be a new map, called the *Town-Wide Map of Potential Conservation Lands*. That kind of document would play a central role in ensuring that the open space designated in each new subdivision will form part of a larger open space network comprising parts of several contiguous parcels, helping to preserve the integrity of natural systems, and also assisting in the maintenance of the neighborhood's character.

One final thought about the *Land Use and Transportation Plan*: Drawing from my experience in the Keystone State, the *East Pikeland Comprehensive Plan* contains a critical sentence stating that "The nature of existing development practices should be analyzed to determine the extent to which the municipality wishes to continue or discontinue selected practices." This is an excellent sentiment. I believe something like this should be printed in bold-face type in every such municipal plan. That passage recently led to the engagement of a planning consultant to personally visit and photograph the vast majority of subdivisions built there since the late 1950s. He then prepared a constructive critique of what he found, highlighting positive aspects to encourage in future subdivision designs and negative features be avoided.

I recommend that officials visit past and present developments in their community to critically evaluate them, to learn first-hand how those subdivisions either succeeded or failed in terms of implementing the few policies in your current *Land Use and Transportation Plan* that address conservation concerns, such as this passage from page 58: "The preservation of existing natural features and the scenic beauty of the Town are paramount concerns of Town residents."

Learning from past mistakes or missed opportunities helps any community avoid repeating errors and helps them to reach as high as their ideals. (To do this best, it is recommended that the applicant's original site analysis map showing all the property's existing features prior to development be retrieved from the files and studied in order to appreciate the conservation opportunities overlooked at the time and subsequently lost forever.)

With great prescience, your Plan states that "Existing zoning...provides little incentive for developers to practice environmentally sensitive development design."

The most hopeful sentences in your current plan are found on page 59:

"Open space overlay zoning will be developed to allow residential development while preserving sensitive natural areas."

"Places of rare natural beauty should be preserved."

"Mature vegetation... should be protected from indiscriminate removal."

"Enhance existing mountain stream greenways with new greenways where appropriate."

Subdivision Regulations

Purpose. This section (103) is surprisingly devoid of language mentioning the importance of conserving natural or cultural features, but does contain the briefest mention of the need to conserve open space for recreation and the need to conserve water. Such brevity misses an important opportunity to say more about what makes the Town special and now these regulations are designed to protect those attributes. In light of these short-comings, I would suggest that the Town consider adding additional purposes, such as:

1. To provide for open spaces and environmental protection through the most efficient design and layout of the land
2. To preserve the natural beauty and rural landscape of the Town, to conserve its historic and cultural features, and to ensure appropriate development with regard to those special character-giving features
3. To help protect interconnected networks of open space, to protect water resources, to sustain a diversity of native vegetation and wildlife, and
4. To help establish substantial buffers along boundaries with scenic roadways, existing protected land, and actively-worked farmland.

My point is that even conventional subdivisions can be designed with some greater degree of sensitivity to the natural and cultural landscape than they are at present, and that the Town should not set its sights too low when dealing with non-conservation subdivisions.

One further idea is the following:

As many such "Purposes" sections speak of the need to "mitigate significant negative impacts of proposed development", it would be refreshing if this part of the code were worded to state that developments should produce positive environmental outcomes. As typically worded, success could be defined as "getting down to zero", which is an odd way for a community to define the future it wishes to create. For instance, habitat areas that have been degraded by forest clearance and/or agricultural drainage could be restored or at least enhanced through management practices within open space preserved in new conservation subdivisions. As an example, drain tiles from old farm fields converted into subdivision open space could be crushed, allowing the original hydrology to reappear, supporting wetland vegetation and attendant wildlife. And cleared areas (either played-out croplands or abandoned mineral workings) could be planted up as conservation meadows providing habitat variety for local wildlife.

Subdivision Procedures and Plan Requirements. Most of the comments I would make with regard to subdivision procedures and plan requirements have also been covered in the "General Memo" accompanying this document. Key elements of those articles describe a fuller set of procedures and plan content requirements pertaining to more detailed

Context/Vicinity Maps and Existing Resources/Site Analysis Maps, Sketch Plans as overlay sheets on top of the *Existing Resources/Site Analysis Maps*, an *On-Site Visit* by local officials with that detailed site analysis map in hand, and a four-step design process in which open space is identified from the outset (in relation to a *Town-wide Map of Potential Conservation Lands*).

Vicinity/Context Maps. The Vicinity Map required in Section 401.5 should, I believe, be substantially expanded in scope and content so that staff and Commission members may acquaint themselves with the resources and development patterns in the vicinity of the proposed development site at an early stage of the process. This expanded item would then be re-named as a *Context Map*. To minimize the cost involved, it would show only data that can easily be reproduced from existing published sources such as aerial photographs, USGS topo sheets, FEMA floodplain maps, and USFWS wetlands maps. These readily-available maps and photos should then be reproduced by the applicant's engineer to the same scale (1" = 400 feet), showing reviewing officials the location of natural features and development patterns on properties within one-half mile of the development site (expanding the document by about five inches around all four sides). The value of such an enhanced *Context Map* would be to help reviewers understand the relationship of resources on the subject property to natural and cultural features (and to possible development patterns) on adjacent and nearby lands. This kind of understanding is critical to planning for improved buffers and open space connections, and minimizing developmental impacts in the neighborhood.

Existing Resources and Site Analysis Map and Site Visit. Because it is impossible to completely understand a site only by examining a two-dimensional paper document inside a municipal building, it is essential that most of the Planning Commission members and staff walk the property with a comprehensive map, analyzing all relevant site conditions and identifying the significant and noteworthy historic and cultural resources, to take the full measure of the proposed development site. I also recommend inviting the abutters along at this time, very early in the process, when their input might actually be able to make a difference. Waiting until the public hearing stage to solicit their views and recommendations is unfair to them because by that time so much money has been spent on engineering design details that the applicant is most unwilling to go back and make any substantive changes. I have also witnessed abutters taking a much more reasonable and sometimes even relatively positive view of the proposal, once they have experienced the site walks, and have seen how the proposed open space protects important features and buffers their properties. It also gives the applicant an early opportunity to modify some aspects of his proposal to demonstrate his willingness to listen to their views and to make his peace with them while lines are still very fluid and easy to change.

Site visits really help provide a much better understanding of the best locations for potential conservation areas on the subject parcel, and their potential linkages to natural or cultural features on adjacent properties that might be sensitively developed sometime in the future, using conservation design techniques. It is impossible to understand any site and to make good decisions when the information base is incomplete. Applicants need more specificity, and the Town needs to be clearer about what it requires if it is to be able to reject applications not supplying enough detailed information to enable officials to make fully informed decisions.

(Not having this vital information is like trying to play Gin Rummy with a 34-card deck.) One needs to know where the woodlands and hedgerows are located, for example, and within those areas where the trees of greatest magnitude are growing. With modern GPS (Global Positioning Systems) technology available to most engineering firms today, it is quite easy to pinpoint the location of individual objects in the field, such as trees, rock outcrops, etc. A number of communities with which I have worked routinely require that developers' plans show the location of every tree greater than a given diameter (which varies with species), and that these trees be identified by species on the drawing. In this way, reviewers can identify those parts of woods that are more worthy of conservation and "designing around" (which trees to hug and which to let go). However, I would not require this information for trees growing in areas that would not be disturbed because of their location within proposed conservation areas. I would not require invasive non-native trees to be identified unless the goal is to remove them (which would not be a bad idea). Similarly, one should definitely add vernal pools and their associated upland habitat areas (essential in the life-cycle of salamanders and other woodland amphibians) and "views into the property from public roads or highways", to enable those important considerations to be properly evaluated.

Another factor that is absolutely key at this point in the inventory process is soil data, specifically the location of the best soil available on the entire property. In the absence of sewers, and recognizing the disadvantages of stream-discharge "package plants" (which fail to remove nitrogen and phosphorus pollutants, and which fail to recharge local aquifers), suitable soils are a basic necessity. Both individual and community systems need the deepest, best-drained soil that can be provided, and those areas must be "designed around" just as carefully -- and from the very beginning -- as any of the "Primary Conservation Areas", so they may be reserved for sewage treatment and effluent disposal and not be carelessly covered by foundations, driveways, or streets.

If we agree that these items are necessary and should be submitted at some point during the subdivision application process anyway, it doesn't increase the applicant's costs for them to be required up front where the important information they provide can be of the greatest use (helping to avoid wasting money on plans that do not take these features fully into account).

Regarding timing, I really like to walk the site with the applicant well before the *Sketch Plan* is prepared. Officials who choose not to attend Site Visits, and who do not have good reasons to miss them, should be offered other ways in which they might serve the Town. In my judgment they cannot serve the Town well without walking potential development sites. In many communities this is a brand-new concept, and it is often a "hard sell" among municipal officials who are already very busy with many other matters. However, I maintain it is simply not possible to make an informed decision without experiencing the site in question -- unless the application is clearly deficient for certain obvious reasons.

Sketch Plan Overlay Sheet. This document, which would be required, is absolutely essential for the subdivision process to proceed smoothly and efficiently. If the first document to be submitted is the so-called "Preliminary Plan", the process is farcical. I say that because any "Preliminary Plan" which requires street profiles, sewer profiles, manholes, and inverts; water

line size and location; and drainage calculations for stormwater retention (as your code does) ensures that applicants will arrive at their first official meeting with a plans that have been so expensive to produce, with such great engineering detail, that they will be absolutely (and quite understandably) totally unwilling to make any substantial changes in layout. (It is as if one were bringing a \$75,000 diamond ring on his first date.)

A proper *Sketch Plan Overlay Sheet* is far more informative and useful than the bare-bones "rough sketch" which is optional and simply "encouraged" in Section 201.1 (an entirely inadequate provision that does not even list the data items which must be included so that the Town may begin to understand the proposal). The *Sketch Plan* that I earnestly advocate should be prepared on tracing paper as a very useful "overlay sheet" to the same scale as the ER/SA Map. As mentioned in the "General Memo", this format would enable reviewing officials and staff to see clearly how well (or how poorly) the proposed layout avoids impacting the underlying resources, and what opportunities have been taken (or missed) to actually improve site conditions (such by helping to restore habitats degraded by prior agricultural practices).

I believe that this plan (and other more detailed plans submitted later in the process) should be required to be prepared by either a landscape architect or by a physical planner experienced in applying landscape architecture principles to development design. It is relevant to note that South Kingstown RI regularly hires a landscape architect or planner of its choice, with applicants' fees, to walk the site with the developer, to understand the developer's building program (in terms of house widths, etc.), and to prepare a *Sketch Plan* for the developer, so that the planning process gets off to a positive start. I think this a terrific idea and commend it to you most highly. A site designer with a working knowledge of ecological planning principles would probably be the best choice.

The combined influence of the expanded *Context Map*, the *Existing Resources/Site Analysis Maps*, the *Site Visit* (by the entire Planning Commission and relevant staff), the *Sketch Plan overlay sheet*, and the four-step design approach (described in *Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks*) would make a significant difference in the way that sites are approached by developers, their engineers, and Town officials, and in the quality of the resulting layout of conservation areas, houselots, and streets.

A number of other procedural items on which I have comments are listed below:

1. At a new non-voluntary *Sketch Plan* stage, I would require applicants to submit an *Existing Resources/Site Analysis Map*, which would identify the locations of the healthiest woodlands and trees larger than a selected diameter (according to species, as suggested in the *General Memo*), laurel and rhododendron stands (if any), significant wildlife habitat (such as vernal pools and their associated upland habitat), historic or cultural features (at least including cemeteries and military earthworks), geologic features, and public viewsheds. Without this information, Town officials cannot make a truly informed decision about whether the *Sketch Plan* layout has been intelligently drawn or whether it has missed important opportunities to design around noteworthy features.

It is quite impossible to judge the quality of a *Sketch Plan* layout without knowing exactly where all of these existing features are located. Since that information must be submitted sooner or later, it only makes sense to have it in hand from the beginning -- in fact from the very beginning, even before the *Sketch Plan* is submitted, way back in the process when the Site Visit occurs. As mentioned elsewhere in these memos, further details are also needed, such as the location of large trees by species and size, and even ephemeral but critical features such as vernal pools. Relying on an incomplete data-set, having only part of the information that is needed to render a truly informed decision, the only kind of decision which can be made is an uninformed one.

2. As mentioned above, of the engineering informational pieces necessary at the *Sketch Plan* stage, the most fundamental is detailed soils data from test pits or borings, unless the site is to be sewered. My experience in dealing with soils is that they can often be highly variable over even relatively short distances. For that reason I recommend that a "high intensity soil survey" (as defined by the UDSA NRCS) accurate down to 1/10th of an acre be prepared and submitted from the very beginning (as compared with accuracy down to two acres available from the survey books published by the government). I would definitely retain and upgrade this requirement, and would encourage this critical part of the puzzle to be sorted out as early on in the design process as possible (definitely at the *Sketch Plan* stage), because it really drives so many other project design aspects.

Streets

The following comments are based upon my long standing philosophies, which have evolved over decades of experience working with local governments around the country. As I was not given a copy of the Town's "New Street Criteria" for review, these comments might or not apply specifically to Signal Mountain.

Cul-de-Sacs.

Most codes limit cul-de-sacs to something like 1000 feet in length, regardless of the number of lots served. Regarding maximum length, public safety rationale has historically been based on the fact that cul-de-sacs began to appear in the 1920's, when most subdivisions were still built as infill or extensions to established neighborhoods in or at the edges of older towns, often supplied with public water and fire hydrants. The genesis of the more typical 600-foot maximum length is that this corresponded with the standard length of fire hose that fire engines carried. Seen in that historic context, such a standard loses its rationale when developments are built well away from the fire hydrant service area.

Rather than limiting street length *per se*, I recommend limiting the number of lots cul-de-sacs may serve, because it is the number of residents potentially at risk in the event of an emergency when the single-access street is blocked that is important, not the length of asphalt leading up to their homes.

The national standard advocated by the American Society of Civil Engineers (ASCE) in its excellent volume *Residential Streets* is 25 households, before a second ("emergency") access is required. The idea is that if, for example, 25 households were located along a 1000-foot cul-de-sac, that situation would not be more risky than 25 households living along a 2000-foot cul-de-sac (for example).

I highly recommend requiring central planting islands within cul-de-sac turnarounds, according to several basic design standards. First, these should be planted with canopy shade trees, whose graceful spreading branches will, upon maturity, fill the large "celestial space" that lies above these huge turning circles. Second, a growing number of planners are beginning to recommend that cul-de-sac planting islands be designed to perform double-duty as "bio-retention areas" designed to promote groundwater recharge through infiltration trenches, and I concur with them on that important point. A requirement that cul-de-sac turnaround pavements be pitched inward toward the center would be a good start in this direction

An alternative to standard short cul-de-sacs is the "loop lane" or "close" (graphics appended). Instead of there being a 50-foot wide ROW leading up to a turnaround with a 130' outer-edge diameter, the street would be designed as two parallel lanes 16 feet wide within a 130-foot wide ROW separated by a central bio-retention area or planting strip perhaps 60 feet wide. Such streets or boulevards could be limited in length to 800 or 1000 feet, if desired.

I would also recommend requiring developers to erect signs reading "Temporary Cul-de-sac" whenever a future street connection has been required. This would put all lot purchasers on notice that street connections will ultimately be established, thereby making it harder for them to argue to the Town that they had assumed the cul-de-sac would remain as such forever, when they made the decision to buy their lot or house. Also, requiring developers to fully pave such extensions right up to their perimeter boundary line (instead of simply reserving space for them on their paper plans) would also be a wise and prudent move.

Pavement Width: In my professional judgment, minimum pavement widths of 18-20 feet are ideal for local (service) streets and 22 feet is fine for collector streets, with sufficient off-street parking in driveways and garages. When densities rise and lot sizes decrease to below 10,000 sq. ft., on-street parking provision becomes a legitimate issue, and the addition of an eight-foot parking lane becomes justifiable.

Reverse Curves: Many codes prohibit reverse curves (without straight tangent sections between them) for local and collector streets, thereby also prohibiting graceful meanderings. On arterial streets with speed limits of 35 mph or more. I would suggest allowing reverse curves when the horizontal radii of the curves are very long and gentle, 350 or more feet in radius.

Roadway Grading and Shoulder Standards. Many codes contain a truly counter-productive requirement calling for the clearing of the full width of street rights-of-way (50 and 60 feet for local/service and collectors). In my view, this is an excessive and unnecessary practice ensuring that new streets constructed through wooded areas will resemble airfield landing strips. The origin of such requirements is probably the highway design manual, when

engineers were worried about people travelling at highway speeds crashing their cars into trees growing within the rights-of-way. In most rural communities with which I am familiar, the older rural roads running through wooded areas are almost never graded out to the right-of-way lines, and it is likely that residents would complain loudly and most bitterly if that kind of clearing were to be undertaken. With the lower and more reasonable street geometry and design speeds advocated in this memo, the potential occurrence of serious accidents involving trees is greatly diminished. I would suggest that you insert wording specifically prohibiting the clearing and grading of more land than is essential for the construction of the street and utilities. By clearing fewer trees, the stump dumps required to be located within new subdivisions could be reduced in size, meaning less site disturbance in those locations as well.

Regarding shoulder requirements, I would recommend three feet of sand and gravel sub-base. I also recommend loaming and seeding shoulders, providing a firm base for pulling partway off the road when parking. It is usually not necessary to pull completely off the road unless one is interested in moving vehicles through subdivisions at the greatest possible speed and with the fewest impediments. When vehicles are parked partly on and partly off the road, they tend to slow down the traffic, because when opposing vehicles approach each other in such situations, one slows down and lets the other one through. This kind of "traffic-calming" is becoming increasingly recognized as a positive thing, especially in residential neighborhoods with many children and pets.

An excellent example of a new subdivision street where the grading was minimal and roadside trees were preserved can be seen on page 334 of *Rural by Design* (Fig. 20-9b), from Guilford, CT.

Curbs and Stormwater. In a rural community with low-density development, my view is that curbing is quite unnecessary (also counter-productive). However, in sewered areas with lot sizes that might well be in the range of 8,000 to 13,000 sq. ft. (if conservation design and 40% usable open space is adopted, as recommended in these memos), curbs could well be justified. Conservation planners such as me generally favor open swales rather than curb-and-gutter, except in situations where lots are in the village/hamlet size range (as stated above). Besides imparting a needlessly urban aspect to residential streets, curbs in rural subdivisions channel all stormwater into pipes and detention basins, rather than allowing part of the stormwater to infiltrate the ground as it flows along grassy swales. Such infiltration could be increased through the construction of so-called "rain gardens" to intercept stormwater runoff at various points along the street (say for every 4-6 lots), which are designed to serve as infiltration areas landscaped with moisture-tolerant trees and flowers. Another effective stormwater management technique is to require that downspouts be connected to "French drains" located in yards.

I would suggest that aquifer replenishment is another worthy reason why the Town should take a strongly affirmative stance encouraging creative alternatives to typical "bomb crater" detention basins providing virtually no infiltration, and which are often ugly to look at and more difficult and expensive to maintain, compared with newer, smarter approaches suggested in this memo.

If some form of curbing is unavoidable, may I suggest the technique called the "thickened edge" (illustrated in *Rural by Design*). My local public works department recently repaved my street in this manner, and it is highly effective in containing the stormwater. It is far less expensive than standard curbing, and is visually much less intrusive, an important consideration in rural areas.

Stormwater standards should apply to both the rate and to the total volume of runoff. I have read Article 11 and am not sure if it requires post-development runoff volume to be no greater than pre-development runoff volume. Certainly runoff rate is regulated, but possibly not volume. A simple clear declarative sentence, without technical jargon (such as "hydrologic response") would help readers understand this section better. Controlling only the runoff rate prevents downstream flooding, streambank erosion, and sedimentation resulting from that erosion, which are all commendable goals. These are necessary objectives; however, they alone are not sufficient. These good regulations could be made even better by mentioning a few of the ways to achieve on-site infiltration and aquifer recharge, a practice which helps to attain the ideal goal of zero increase in runoff volume. Fortunately, conservation design offers many opportunities to disperse stormwater over much broader areas, so that deep engineered structures with steep sides and spillways are not needed in most situations. Even more important than the aesthetic advantage is the groundwater recharge benefit that such infiltration-focused stormwater design brings.

The design flexibility in the *Growing Greener* system permits extensive areas to be utilized for on-site infiltration, such as in conservation meadows or through infiltration trenches carefully located to snake between the larger trees in a woodland setting. If your engineering advisors are not yet familiar with the concept of "rain gardens" and bio-retention areas, I recommend that you obtain descriptive materials for them from the Center for Watershed Protection, in Ellicott City, MD (www.cwp.org). Written by nationally-known environmental engineers who conduct workshops on this topic around the country, the booklets they publish contain a wealth of relevant and helpful information.

Sidewalks. Another important concern involves sidewalks. Section 301.C appears to require them everywhere (except in very low-density situations, with lots of three acres or larger). I absolutely favor sidewalks, but feel they are not necessarily essential on both sides of every local access street and cul-de-sac, particularly if an extensive, well-connected off-street trail system is also being provided. Usually the situation is reversed, and sidewalks are not required in as many places as they should be provided. Many times the rule book takes an extremely myopic view, requiring sidewalks only under certain circumstances, such as within the vicinity of schools, shops, and playgrounds, as if schoolchildren were the only residents possessing working legs (and as if people shopped on foot anymore). Few pupils nowadays live anywhere near the schools they attend, and even if they lived near schools they would probably be driven to the bus-stop and bussed to school. In my experience, village residents tend to drive whenever they can, because no one wishes to lug heavy grocery bags back home, as a pedestrian.

This is to say there are far, far more important reasons to require sidewalks other than to favor walking schoolchildren or pedestrian shoppers. I believe that sidewalks are important for all residents. Numerous surveys have revealed the No. 1 recreational pastime of Americans is walking. Sidewalks provide basic separation between motor vehicles and pedestrians (children walking to/from the school bus, parents pushing baby carriages, couples out for an evening stroll around the neighborhood, etc.), not to mention joggers. In rural situations, sidewalks may take the form of curving asphalt-surfaced footpaths, if desired. My earnest recommendation is therefore that sidewalks be required with a grassy "tree-lawn" separating them from the street pavement in nearly every instance. Sidewalks constructed adjacent to curbs are extremely ugly and provide little psychological or actual protection to pedestrians.

Street Trees. Shade tree planting is arguably the single most important design standard, in terms of ultimate appearance. I might have missed them, but I did not see any such standards in your ordinance, except for Conservation Design (Zoning Section 616)... Some communities exempt tree planning requirements when the street is on a wooded parcel. Allowing existing trees along subdivision streets to substitute for new shade tree planting is extremely short-sighted, in my view. Even with the reduced clearing and grading standards I recommend, planting shade trees within the denuded street rights-of-way in new subdivisions will be essential if you hope the new neighborhoods in the town will ultimately acquire a stately appearance in years to come. Therefore the presence of many trees on a thickly wooded site should never be taken as demonstrating no need for proper shade tree planting along new streets. When swaths are cleared through existing woodlands in preparation for street grading and construction, the trees remaining along the edges tend to be tall and spindly, having grown up in a forested situation with sunlight coming only from above. For that reason, such trees are not round and full in shape, and will not become so for many years (if ever) after being exposed to daylight as a result of the road clearing. These existing trees along the roadside edges are therefore no substitute for new canopy shade tree plantings.

Your code should also provide detailed guidance as to the appropriate species to be planted. Based on many years experience, I favor spacing shade trees at 30-50 feet. My very strong recommendation is that canopy shade trees are one of the most important improvements any community can require of developers. They should be deciduous varieties of hardy species capable of attaining a mature height of at least 60 feet (not flowering ornamentals, which are more suited to courtyard situations and areas of lawn decoration), they should be planted with a minimum dbh of 2-1/2", at intervals of about 40 feet on both sides of each street, in "tree-lawns" at least five feet wide located between the sidewalk and the curb or edge of pavement.

Utilities can and should be located either within the roadway or in a special utility easement located beyond the sidewalk. Such standards will ensure that residential streets created in the town will be leafy and shady in future years. Maintenance requirements are also very important, with replacement assured within 18 months after planting, through a performance guarantee (such as a bond). I feel that shade trees are the single most important aspect of subdivision design, second only to open space preservation

The perceived threat that tree roots might possibly crack and lift sidewalks or rupture footpaths after decades of growth can be greatly diminished -- if not altogether eliminated --

by new techniques devised by urban foresters. One approach involves the developer installing vertical barriers 12 inches deep along the inside edge of sidewalks, to deflect root growth down deep under the sidewalk. The second approach requires that developers install a special "structural soil mix" developed at Cornell University, consisting of large stones with sizable gaps or spaces between them, through which the roots would grow. For further details, see: <http://www.hort.cornell.edu/departement/faculty/bassuk/uhi/ssoils/index.htm>

Recommended species are listed in Section 702.B.3 of the model *Growing Greener* subdivision ordinance, specifically excluding invasive exotics such as Norway maple and structurally weak trees such as silver maple and Bradford Callery pear (which is unsuitable due to structural weakness causing massive limb failure in ice storms and wet snow conditions). I also exclude the Ginkgo, which is a non-native tree that looks very out-of-place in the Southern landscape, with an ungainly shape for many years until it attains a height of 40 or 50 feet, at which time it begins to fill out and look a bit more like a North American tree, rather than an Asian variety dating from prehistoric times (which is in fact the case). The reason to specifically exclude Norway maple is that it invades adjacent woodlands, rapidly proliferating and out-competing native species, so that ultimately it completely dominates the area, shading out saplings of other trees species, as well as shading out native shrubs and wildflowers.

With respect to standards for protecting existing trees during construction, any filling, re-grading, or movement of heavy equipment should be prohibited anywhere within one foot of the outer edge of the canopy "drip zone". Such a standard might help encourage applicants to utilize the flexible conservation design options which give their site designers increased maneuverability to avoid impacting significant trees that should really be saved. The best way to save trees is to give them a wide berth when laying out streets, sidewalks, houses, driveways, and garages. Such care in site planning is far better than constructing tree wells.

Shared Driveways and "Country Lanes". I typically recommend allowing shared driveways for up to three or four homes, and private "country lanes" for up to six or eight homes. Shared drives can be 12 feet wide, and country lanes 15 feet, in rural situations. Standards should also be stated with regard to important considerations such as the depth and type of base and sub-base material, the wearing course, crowning, drainage, maximum gradient, and minimum horizontal curvature (to permit long fire engines to negotiate sharp turns, e.g.). Such standards exist in the *Growing Greener* model codes. A graphic showing how shared drives can vastly improve a situation where a handful of houselots is created from a small roadside farm is shown in Fig. 12-5 on page 206 of *Rural by Design*.

Alleys. Many times communities adopt alley standards that are nearly street-like, mandating 16 feet of pavement width. I suggest 12 feet, or perhaps 10 if one-way. Wide pavement requirements (16 ft.) encourage these back lanes to be used for parking, while narrower ones do not invite that. I consider alleys (or back lanes) to be essentially a form of common driveways, and they could be regulated as such, without maintenance by the Town. Of course, alleys should also be planted with shade trees in the same way as streets, if these back lanes are to become shady, inviting places instead of boring, treeless strips of asphalt.

"Single-loaded" Street Design. As a way of improving the appearance and functionality of neighborhood design, I have long advocated the use of "single-loaded" streets as part of the overall circulation network. (This term refers to street segments bounded by houselots on one side only, the other side being abutted by open space. In less rigid layouts, neighborhood greens bordered by such streets could be introduced into new developments without increasing overall street length and cost by the simple technique of shaving a bit off the width of the proposed lots. In other words, the same street length can easily be designed to accommodate the same number of homes with added greenspace along some of the alignment if each of the lots is reduced in width by 10, 15, or more feet. I have done this on numerous occasions, to transform standard conventional plans into more interesting layout. For those with access to the book *Conservation Design for Subdivisions* (Island Press, 1996), all of the seven examples I designed contain significant lengths of single-loaded streets, with total street length at least somewhat shorter than the double-loaded streets serving fatter lots. In the 18-page *Growing Greener* booklet, Figures 4, 7, 8, 11, 12, and 19 illustrate the same point.

Lots Backing Up to Public Streets. Many ordinances prohibit "double-frontage" lots but do allow them in situations where they would back up to arterials and to collector streets. I recommend discouraging or prohibiting this form of lotting, and favor such restrictions, particularly in open field situations. I also recommend not allowing a certain kind of exception that is commonly granted by some municipalities, which is to permit this kind of lot layout when the second street is a state highway. Sometimes this exception is dealt with (unsatisfactorily) by requiring buffer strips to be planted along the back lot lines, in open field situations. However, a superior design approach would be to lay out the development so homes would face forward toward the existing public road system, with access via a "parallel access street", keeping backyards more private and the view from the existing road system more attractive (housefronts are always more nicely designed than "housebacks", with their sliding glass doors and pressure-treated decks). Please see Fig. 5-13 in *Growing Greener* to see how a "fanny-first" layout in an open field situation was redesigned to be much more attractive for both residents and passersby through the use of parallel access street concept, with a conservation meadow located between the existing road and the new access street. In such layouts, the depth of the "foreground meadow" could be reduced from 500 feet (cited above) to 300 feet. (In totally wooded situations, a no-cut buffer at least 150 feet deep should be required along back lot lines that face toward existing public roads or highways, to buffer the viewsheds from these thoroughfares.)

Interior Lots (or "Flag Lots"). The absolute prohibition of "flag lots" in Section 304.2 is an example of overkill, in my professional judgment. Certainly this form of lot design has been abused in the past. However, it remains a most useful tool when designing conservation subdivisions. Due to past abuses of the flag-lot design approach, many communities have taken the easy step of banishing this form of lot configuration, not even allowing them in special situations where they would make great sense, such as at the ends of cul-de-sacs or along tight road bends. As a site designer I can tell you how valuable this aspect of design flexibility is when laying out conservation subdivisions minimizing the impact on natural and historic resources. The flag lot concept can be overdone unless it is carefully controlled. In my book *Conservation Design for Subdivisions* there are flag lot locations at the ends of cul-de-

sacs appear in numerous cases (pp, 68, 88, 94, and 110). In the 18-page *Growing Greener* summary booklet, flag lots may be seen in Figures 7, 8, 11, and 12. I cannot see any problem with that kind of spatial arrangement, and as it reduces overall street length it would seem to be desirable to encourage rather than prohibit.

On-Lot Septic and Wells. It is unclear to me whether the Town (or County) requires that septic system drainage fields be located within the lots they serve, or whether they may be located under the common open space. It is reasonable to expect that each lot must have an approved soil suitability determination from state agencies, but that leaves open the question of whether the actual site of that "determination" must be located within the confines of each lot or whether it may be located within the common open space in a place convenient to the lots whose systems would be situated there.

Whether individual wells and septic systems must be located on-lot or whether they may be located off-lot has enormous implications for the ability of site designers to produce high-quality conservation layouts in your community. I favor the latter approach, and would clarify that wording to specifically state that individual wells and drain fields may be so situated. In Pennsylvania, where I have worked for nine years, both Chester Town and the state DEP permit individual septic systems situated within common open space in cluster layouts, and if this not yet the case in the Town, I would urge you to allow such arrangements to encourage smaller lots and higher percentages of conservation land. I would also explicitly allow individual wells to be located within the common open space too, in areas specifically reserved for them on the *Final Plan*. This would enable such individual utility systems to be located under "conservation meadows", playingfields, or village green-type areas that could also serve as an invaluable buffer area between suburban back yards and working farmland next door. This very important concept is more fully explained (and illustrated) on pages 47-48 of *Growing Greener*. It is also depicted in Figures 8 and 20 in the 18-page *Growing Greener* summary booklet.

ZONING ORDINANCE

Overall. The most critical deficiency of the Zoning Ordinance, in my view, is that it does not appear to allow flexible lot sizes (essentially precluding conservation design) as a by-right Permitted Use, and that submission standards and review criteria for Planned Unit Developments (PUDs) are wholly inadequate in terms of data requirements and design standards for open space. This deficiency is related to a continuing reliance on conventional platting techniques that are actually inconsistent and at odds with the kinds of policies, goals, and objectives for open space and natural resources protection that are the foundation of Comprehensive Plans in most other communities.

(Note: I have also read the more recent zoning amendments which were adopted in 2004 and later rescinded. The chief difference between the older and the newer versions, as I perceive the situation, is that the more recent one increased the legal building density -- in sewered locations -- from about two du/ gross acre for "Conservation Design" developments in the older version (Section 616.C), to about four du/gross acre for "open space subdivisions" in the

newer version. However, as the older (and once again current) version originally allowed and now continues to allow sewered PUDs at four du/gross acre (in Section 613.07.01), the density standard would seem to be four du/gross acre in either case. As an outside observer, I do not feel it is my place to recommend any particular density to people living in other communities. However, the way that density is applied and put on the ground is a central concern of mine professionally, and forms the basis for many of the comments in the ensuing section of this memo.)

Purposes. Of all the zoning ordinances I have reviewed over the years, I cannot recall ever reading a Purposes section such as the one in yours (102), where there is absolutely no mention whatsoever of the desire to protect scenic character, environmental resources, historical or cultural features, or even to promote the creation of attractive neighborhoods and ensure harmonious development.

Below is a list of a dozen purposes taken from the section of my model Zoning, illustrating just how many concepts could be incorporated into Signal Mountain's zoning if the community so desires.

1. To conserve open land, including those areas containing unique and sensitive natural features such as woodlands, steep slopes, streams, floodplains and wetlands, by setting them aside from development;
2. To provide greater design flexibility and efficiency in the siting of services and infrastructure, including the opportunity to reduce length of roads, utility runs, and the amount of paving required for residential development;
3. To reduce erosion and sedimentation by the retention of existing vegetation, and the minimization of development on steep slopes;
4. To provide for a diversity of lot sizes, building densities, and housing choices to accommodate a variety of age and income groups, and residential preferences, so that the community's population diversity may be maintained;
5. To implement adopted municipal policies to conserve a variety of irreplaceable and environmentally sensitive resource lands as set forth in the municipality's *Open Space Plan*, including provisions for reasonable incentives to create a greenway system for the benefit of present and future residents;
6. To implement adopted land use, transportation, and community policies, as identified in the municipality's Comprehensive plan;
7. To protect areas of the municipality with productive agricultural soils for continued or future agricultural use, by conserving blocks of land large enough to allow for efficient farm operations;
8. To create neighborhoods with direct visual access to open land, with amenities in the form of neighborhood open space, and with a strong neighborhood identity;

9. To provide for the conservation and maintenance of open land within the municipality to achieve the above-mentioned goals and for active or passive recreational use by residents;
10. To provide multiple options for landowners in order to minimize impacts on environmental resources (sensitive lands such as wetlands, floodplain, and steep slopes) and disturbance of natural or cultural features (such as mature woodlands, hedgerows and tree lines, critical wildlife habitats, historic buildings, and fieldstone walls);
11. To provide standards reflecting the varying circumstances and interests of individual landowners, and the individual characteristics of their properties; and
12. To conserve scenic views and elements of the municipality's rural character, and to minimize perceived density, by minimizing views of new development from existing roads.

Minimum Lot Sizes: Signal Mountain, like many other municipalities, commits the fundamental error of regulating density through the indirect method of setting minimum lot sizes. This counter-productive approach unintentionally robs the community of the very resource lands that give it its special rural character. Instead, I have long advocated regulating density directly, by stating that no more than one house may be built per X amount of buildable land on any given property. And I then address the open space conservation issue by setting a maximum lot size (or an average maximum lot size) -- smaller than the current minimum lot size -- in order to be able to set aside land during the development design process, while still attaining the normal building density. When regulating density directly in this way (rather than indirectly *via* minimum lot size), the issue of minimum lot size becomes far less important. In fact, the smaller the lots become, the greater the open space becomes, as density is established by tables stating the overall land requirements per dwelling unit.

By-Right Designation: One can hardly overstate the importance of classifying Conservation Subdivisions as by-right Permitted Uses, and also classifying conventional developments as Special Permit uses, or Conditional Uses.

Many local ordinances which allow flexible design approaches unwittingly sandbag them by classifying them as Special Permit uses or as Conditional Uses. When your Zoning is again updated, these issues will come to the forefront of discussion. Although your dysfunctional PUDs require Special Exceptions (in Section 603.04), conservation design (in Section 616) apparently does not. The next logical step would be to abolish or reform PUDS and to re-classify conventional development as Special Exceptions (or CUs).

Classifying flexible developments as requiring Conditional Uses or Special Exception permits typically produces a chilling effect upon many applicants, frequently discouraging them from opting for the flexible design approach that municipalities actually want to encourage. I have

found that local governments can control as much, if not more, with detailed standards in the subdivision ordinance as they can with the Conditional Use process.

Conservation Design subdivisions with lots smaller than those typical in conventional developments can be made to "perform" well through a set of detailed and strict "performance standards" relating to the quantity, quality, and configuration of the protected open space. Extra measures of protection for the Town, such as those guiding the design process (the "four-step" method, plus the detailed "Resource Conservation and Greenway Delineation Standards", both contained in my model subdivision ordinance -- Sections 402.C.3 and 603) should give officials a greater feeling of security that this new approach will produce superior results. These recommended standards are more comprehensive than those contained in your current ordinance.

Minimum Tract Size and Requiring Clustering. The common zoning requirement that conservation subdivisions occur on tracts of at least 20 acres effectively ensures that many parcels will be denied the advantages of flexible site design. This is a pitfall that Signal Mountain has avoided, with its 10-acre minimum. Small minimum tract sizes such as that are a healthy attribute (in my view), as conservation subdivisions can sometimes serve very beneficial purposes on surprisingly small parcels. For example, in Lower Merion Twp., (Montgomery Town, PA), the Board of Commissioners ten years ago decided to mandate this design approach and to apply it to every parcel containing five or more acres. They recognized that even parcels at the lower end of the size spectrum could contribute a greenway link (such as along a stream valley), providing connections between open spaces on each side. Even if only two acres of flat dry ground were to be conserved on a four-acre tract, that would be plenty to serve as neighborhood green (or informal playing field), significantly enhancing the quality of life for nearby residents. In more rural districts, clustering can be extremely important as an implementation tool in a potential Scenic Overlay District and other potential overlay districts pertaining to riparian areas, groundwater recharge, constrained soils or steep slopes. In a Scenic Overlay District, for example, significant open space can be required to be located within the public viewshed. For that reason, Newcastle Town, DE, ten years ago mandated clustering in the Red Clay Valley, a particularly scenic part of the Brandywine Hundred (as described in *Rural by Design*, pp. 193-96).

Determining Density. In the model conservation zoning provisions I have developed over the past two decades, I recommend that applicants be given two alternative methods for determining density. I have always favored offering applicants the choice between a purely mathematical approach (in which certain types of constrained lands are deducted) and a map-based approach called the "Yield Plan". I actually favor the latter for its simplicity and directness (as contrasted with sometimes controversial ways of calculating actual buildable land and basing density on that net acreage only). "Yield Plans" demonstrate the maximum number of units that could be built in a prudent and responsible configuration, conforming to the standard dimensional criteria. They must, of course, be realistic, without make-believe lots that would be unbuildable in the real world due to site constraints. In other words, "Yield Plans" must pass the "straight-face" test. (This is explained on page 43 of *Growing Greener*.)

There is a need in my judgment, for the Town to be specific as to how such "Yield Plans" must be prepared. Town In unsewered areas, for example, applicants would be required to submit deep-hole test pits to demonstrate septic suitability on a 10% sample of lots selected by the Town (the most dubious lots, based on soils map data, the elevation of the land within the property, vegetation patterns. etc.). If any of the sample lots fail, the Yield number is reduced and the applicant waits four weeks to submit a second 10% sample. This process continues until all the lots in a given sample pass the test for septic suitability. Developers who recognize the time-value of money will not horse around with fictitious lots and will be forthcoming with a realistic Yield Plan. (Model ordinance language describing "Yield Plans" in greater detail can be found in the *Growing Greener* book -- and on the CD-ROM of the same name).

Calculating Open Space Areas. Perhaps I missed it, but I did not see any specific minimum percentage of open space for PUDs (one very big reason I consider them to be dysfunctional), except that open space shall be provided to some unspecified degree, and that it must not be either unbuildable or inaccessible (!). For this and many other reasons, I strongly suggest that the PUD section of your ordinance be given a speedy and decent burial, to be superseded entirely by the Conservation Design approach, which at least possesses some explicit -- if minimal -- open space requirements. (Another reason for dispatching the PUD regs: the underlying zoning density of two du/acre is inexplicably more than doubled, to four du/acre, based on gross tract area, which often includes completely unbuildable land, quietly conferring a sometimes very large and not-so-obvious density bonus to developers whose have bought difficult parcels containing much unbuildable land.)

In the Conservation Design Overlay District, the 25% open space requirement is flawed in two ways. First, it does not reflect the potential for easily preserving 40% of buildable land as open space (simply by reducing lot sizes proportionately). Second, it appears to contain absolutely minimal standards for ensuring the quality of the resulting open space, allowing the conservation land to be almost entirely wet or steep -- inherently unbuildable and practically unusable except by bullfrogs and mountain goats. (Only 2% of the 25% open space must be relatively flat and usable for active recreation, amounting to a mere 0.5% of the total tract area.) I address this issue in my model regulations by specifying that the minimum required open space must be in addition to wetlands and steep slopes. It cannot be said too many times that this kind of approach does not represent a "taking", because the open space typically remains in private hands, and because the applicant's overall building density remains completely undisturbed.

In a district where two du/acre is the norm, lots that would ordinarily run about 22,000 sq. ft in area could be resized to about 13,000 to achieve 40% open space. In districts where (for example) three du/ac might be the goal, normal-sized lots of about 13,000 sq. ft. could be redrawn to be about 8,000 sq. ft. Elegant ways to design such neighborhoods would ideally blend conservation design with the principles of "New Urbanism", as described and extensively illustrated in my fifth book, *Crossroads, Hamlet, Village, Town: Traditional Neighborhoods Old and New*.

(Again, I should re-iterate my standard position of neither endorsing nor criticizing any particular locally-adopted density level. I leave that up to local residents to decide, although I feel professionally obliged to comment constructively on the way that this density is actually arranged on the land. In my experience, it is often possible to arrange greater density so that substantially more open space and conservation land is protected with smaller lots than would be the case with larger lots and lower overall density. If there is a sound public purpose for supporting greater density in any given area, then I feel that area should be zoned in such a manner that unfragmented, usable land is set aside for conservation purposes. And I usually turn to the principles of the "New Urbanism" to achieve that result, even in rural areas -- where the hamlet or village model becomes very relevant.)

If a simple Yield Plan were required of applicants -- to demonstrate how many regular-sized lots could actually be created on their property (given its physical constraints) -- that same number of lots could still be created with 40% of the unconstrained land being preserved as open space, in addition to the unbuildable land where the Yield Plan would of course show no development. That is because the re-sizing of the lots could create the potential for 40% of the buildable land area to be preserved as value-enhancing neighborhood greens, squares, parks, ballfields, and greenways.

Permanent Protection of Open Space: I suggest requiring conservation easements rather than just covenants or deed restrictions. These easements would typically be held by conservation groups such as land trusts, Conservation Commissions, and Soil & Water Conservation Districts. Designating multiple holders of such easements is also a wise idea, to ensure protection if one organization wavers in its commitment. I saw permissive wording in Section 616 allowing easements to be created, but I did not see any language requiring them. If this is indeed missing, it is a significant omission in the ordinance.

Open Space Ownership Options: Regarding ownership options, in addition to HOAs, I recommend land trusts and public bodies as designated holders of the open space, as well as "non-common" open space owners such as wholesale nurserymen, operators of equestrian facilities, operators of Community-Support Agricultural operations, etc.

The concept of non-common ownership is an idea I have been advocating for years. In southeastern PA, I know of conservation subdivision open space having been sold to individuals who use it for specific purposes, such as wholesale nurseries, orchards, and equestrian facilities. I have examples of all of the above in my slide collection, and frequently include them in my presentations. Another non-common ownership is the "conservancy lot", typically at least 10 or more acres in size, which would support a principal dwelling, perhaps a barn or stable, and also an accessory dwelling unit (such as a caretaker's cottage, which could also be rented out as a granny flat). The uses allowed on non-common open space must be strictly limited and regulated, and they should be subject to the same kinds of permanent easements and Management Plans as any other kinds of open space.

Non-common ownership not only relieves HOAs of acreage they would otherwise have to maintain, but also provides developers with an additional bonus for doing the right thing and opting for conservation design.

HOAs work well with mandatory or automatic membership (which is required in 616) and would function even more effectively if the Town were to require that their bylaws be drafted to specifically state that the HOA possesses legal authority to place a lien on the property of any member who fails to pay his dues, after being issued three notices. Quite frankly, few people enjoy being known as deadbeats, cheapskates, or free-loaders among their own neighbors, but sometimes a cantankerous old curmudgeon might decide to withhold dues payment for some reason. Not to worry, as he cannot sell his property without paying all back dues, with full interest, to the HOA. Another word on HOA's: I believe they should regulate only the common open space, not the land within houselots (as does the HOA where my brother lives, in Sonoma, CA). Individuals' houselots should be their own domain, in my judgment, and regulating what people do on their own lots simply invites internal strife. I recommend that HOAs authority be limited to common lands such as village greens, playing fields, trails, etc, plus the woodland conservation areas and any farmland that might be leased out to local farmers.

Perimeter Buffers. I believe that conservation subdivisions should be subject to the same buffering requirements as pertain to conventional large-lot subdivisions. In other words, no special setbacks should be required, other than the standard ones for homes on standard-sized lots. If buildings on the normal half-acre lots are required to be set back by a certain distance in a particular rural district, that would also be the appropriate building setback for use in conservation subdivisions. For multi-family housing, which constitutes a different house type, an exception could be made in terms of size and bulk, often with different parking provisions. The common 100-foot landscaped buffer requirement found in many cluster ordinances might be appropriate if the land use were a quarry, sandpit, junkyard, or mobile home park. But it is counterproductive for conservation subdivisions. On a 36-acre tract, for example, such a requirement could consume fully 44% of the total acreage, not a sensible way to distribute the limited open space. Conservation lands should be designated according to other criteria other than buffering new single family dwellings from pre-existing single-family dwellings.

Streamside Buffers. The 30-foot naturally vegetated streamside buffers required in Section 616.F.c could easily be increased to a more standard 75-foot no-cut buffer by implementing the recommended re-sizing of lots and consequent increase in the percentage of open space able to be conserved. Similarly, the 50-foot streamside buffer in steep-slope situations could just as easily be increased to 100 feet, applying the same design techniques.

Lot Size Reduction Potential. The best conservation design regulations do not set any minimum lot sizes or frontage requirements, which I believe is very progressive, as density is strictly capped in other more direct ways, as it properly should be.

The most progressive code provisions I have seen, such as contained in parts of the Lower Merion (PA) zoning ordinance, essentially dismiss the notion of minimum lot size and concentrate instead on the really important elements: the maximum number of dwellings permitted, the minimum percentage of quality open space required, and minimum separations between buildings. A basic tenet of conservation planning under *Growing Greener* is that lot

size minima are almost irrelevant, as overall density and minimum open space are both established in another way. In fact, the smaller the lot, the more open space there is. In Lower Merion, where similar ordinances have been in effect for about ten years, the absence of lot size minima has not led to abuses in that direction. Developers there have routinely produced the largest lot they can under that community's ordinance while still meeting the basic 50-60% open space minimum standard. In conservation design, the *maximum* lot size is the critical element, as it really defines the minimum open space that must be conserved. I would be pleased to discuss with you how the idea of "maximum lot sizes" for conservation subdivisions could help the Town achieve a greener future, with interconnected networks of open space permanently protected for future generations to enjoy.

A New Look at Density Incentives. One central question hovering over the subject of using conservation design to protect significant parts of a Town concerns how to ensure that developers will utilize the preferred approach, and not continue to stamp out the familiar pattern of "wall-to-wall" houselots. Most of the older cluster ordinances on the books today include density bonuses as a "carrot" to entice developers to select this option. However, my experience is that density incentives (when unaccompanied by density *disincentives*) typically need to be rather huge, in order to persuade many developers to do anything different from the standard cookie-cutter in situations where they can easily continue to build these land-consumptive layouts at full density, by-right.

As you probably already realize, large incentives often set up a certain negative community dynamic inadvertently, wherein local residents (often abutters) vent their displeasure at having to put up with a significantly higher number of people living nearby, not to mention more schoolchildren to educate, and more traffic to congest the roadways. Rather than face such opposition, most developers usually opt for the simple and relatively hassle-free route, with standard full density in standard lots and no open space.

- For many years I have advocated *reversing this dynamic*, so that developers must "earn" their basic full standard density through conservation design with significant open space. Under this approach, there is no density bonus for the standard conservation subdivision with the percentages recommended above for the unconstrained land designated as open space. That kind of development becomes the basic standard, and is the only way for developers to achieve full density. Those who wish to continue with cookie-cutter designs covering the entire development tract with houselots and streets may do so, but only at a substantially lower overall density, such as one-half or one-third the normal lot yield. Or they decide to work in other municipalities with lower standards instead.

However, if such density disincentives are not politically feasible in Signal Mountain, the community could effect much the same result by classifying Conservation Design as a by-right Permitted Use, and re-classifying conventional land-hog development as a Conditional Use which is structured so as to be extremely difficult to attain, as described above.

Density Bonuses for Special Public Interest Goals. I would also recommend considering density bonuses to encourage the public dedication of conservation land, or at least public access to parts of the conservation land (e.g., existing trails and also new trails, such as along

streamside greenway corridors). Additional density bonuses to provide endowments for land trusts which may eventually own and manage the open space are also advisable, as described on pages 48-49 of *Growing Greener*. A third kind of density bonus could encourage age-restricted housing, which represents a positive cash-flow for the Town because it generates no schoolchildren requiring costly education, and which provides opportunities for older residents (including empty-nesters as well as retirees) to remain living in Town.

Requiring Conservation Design in Certain Situations. As noted above, the Town might consider *requiring* conservation design (instead of conventional plats) in situations where parcels are proposed for development along the Town's pre-determined *Map of Potential Conservation Lands*, to ensure that possible future greenway connection opportunities are not lost. Other areas where conservation design could be required are on properties abutting scenic roads, public parks, Town or state forests, conservancy lands, working farms, etc., as well as in groundwater recharge or aquifer protection districts. This approach would ensure that the interconnected network of open space would become a reality, and not simply be another good idea which is seldom implemented.