

# Creating Greener Communities Through Conservation Subdivision Design

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## **Introduction**

This paper describes what is arguably the most effective land planning technique yet devised in this country for protecting community-wide greenways and open space networks. Its simplicity, ease of use, and cost-free nature auger well for its expanding role as the premier tool available to developers, conservationists, and planners for achieving their separate but complementary objectives of earning money, conserving land, and managing change in their communities.

The various techniques addressed in this paper provide a practical way in which a wide range of land-use professionals (including planners, landscape architects, civil engineers, surveyors, etc.) can help communities shape their emerging development patterns more effectively, so that features which are noteworthy or significant at the local or neighborhood level -- but which are rarely protected under current codes -- will become the central organizing elements around which each development is designed. With far-sighted planning, local officials can help to ensure that most of the open spaces thus protected will ultimately form an interconnected network of conservation lands running throughout their communities.

The planning approach advocated in this paper has already conserved more than 500 acres of prime farmland in a single Pennsylvania township (Lower Makefield, Bucks County) in just five years, and that figure continues to increase as new conservation subdivisions are proposed and approved. At an average land value of \$7,000 per acre (in that county), new zoning and subdivision ordinance provisions have permanently protected \$3.5 million worth of land without any cost to taxpayers, without any equity loss for property owners, and without requiring any controversial down-zoning of pre-existing density allowances. A similar per-acre land value can be attached to the 650 acres of land protected through conservation subdivision design in Hamburg Township, Livingston County, Michigan since 1992, and to the 2,000 acres saved in Calvert County, Maryland during the first two years of the new regulations having taken effect. *The combined value of those lands is probably in the neighborhood of \$15m, which makes this technique possibly one of most cost-effective conservation planning tools available to growing communities on the metro edge.*

This approach can also be described as “the ultimate in property rights,” which permits the “wise use” of land by landowners who no longer have to sell (and forfeit use of) their entire parcel to developers to receive its full development value. Through conservation design, such property owners may retain ownership and use of half or more of their land as “non-common” open space, with all of the new development located on a fraction of the whole parcel.

My professional experience in dealing with a wide range of communities over the past 20 years has convinced me that most of their Comprehensive Plans need to be augmented with more detailed resource inventories and with practical policies describing new land conservation techniques that are both innovative and effective. To help implement such policies, zoning and subdivision ordinances must be revised to set higher standards governing the quantity, quality, and configuration of the open space that developers are required to conserve as a basic condition of approval. This paper addresses those inter-related issues of conservation planning, conservation zoning, and conservation subdivision design.

Along these lines, an emerging approach that has recently begun to be promoted on a state-wide basis in Pennsylvania has been to establish a framework directly linking municipal Comprehensive Plans with new provisions for local zoning and subdivision ordinances that emphasize the conservation of natural lands and cultural features. *Broadly stated, the ultimate goal is the creation of an interconnected network of protected open space weaving through each community.*

This integrated approach is described and illustrated in a new handbook produced by the Natural Lands Trust for the Pennsylvania Department of Conservation and Natural Resources, with funding support from DCNR and from the William Penn Foundation. Entitled *Growing Greener*, this manual has been written in a nontechnical manner to be useful to a wide spectrum of participants in the subdivision design and approval process such as policy planners, zoning administrators, local elected officials, landowners, developers, realtors, engineers, and surveyors - *none of whom typically have any background or training in land conservation or creative site design.* As more people come to understand the practicability of this approach and the potential benefits it holds for their communities, the greater is the likelihood that popular interest in what I call “conservation planning” will increase.

## **Overview**

This paper describes a new “operating system” of municipal plans and ordinances coordinated to conserve significant portions of individual tracts as they are proposed for residential subdivision. In this system, these potential conservation areas are pre-identified prior to development and are permanently protected as individual “building blocks” in a community-wide network of open space.

The principal problem faced by most communities in almost every metropolitan area is the suburban development density for which nearly all of their currently vacant lands are zoned. These densities, typically ranging from 0.5 to 2.0 acres per dwelling, severely limit the potential effectiveness of two oft-touted planning techniques (the “purchase of development rights” and the “transfer of development rights”), which have been designed to minimize adverse economic impacts that zoning density reductions would have on landowners in these areas, who typically look upon their properties as investments upon which they depend to pay for retirement expenses, college tuition, and medical bills.

In both cases, typical suburban zoning densities thwart these two alternative approaches by permitting a very large number of homes to be built on existing undeveloped properties. Such zoning generally drives up the value of these lands beyond the point where the PDR tool is economically viable on a broad scale, and typically limits this technique to a small handful of selected parcels in any single community. Similarly, suburban zoning densities usually permit far more development rights on individual properties than can be feasibly lifted up and transferred to more suitable areas in other parts of the community (assuming that such “receiving areas” for substantially increased density can be designated without igniting political firestorms).

As long as significant “down-zoning” (reducing legal building density) remains politically unachievable, the reality is that local governments will have to find other ways to better control the *pattern* of new development so that it does not indiscriminately fragment and consume resource lands important for agriculture, forestry, wildlife habitat, etc. This paper describes the new *Growing Greener* program in Pennsylvania, which integrates conservation planning with new model conservation provisions for local zoning and subdivision ordinances. Special features of this program are an expanded “menu” of up to five zoning density options for landowners (keyed to various levels of open space protection), and a logical “four-step” approach to designing subdivisions around the central organizing principle of land conservation.

### **Attributes of Successful Conservation Communities**

To help communities determine whether they have taken all of the steps necessary to ensure that conservation values are adequately weighed against development needs, the Natural Lands Trust has prepared the following list of self-diagnostic questions. For many people, looking at the issues in this way will help them obtain a clearer understanding of the critical activities their communities need to undertake if they are to increase the effectiveness of their land planning and conservation efforts. These “measures of success” have been posed as questions by Michael Clarke, former Trust president, to help local leaders discover and identify areas that their community needs to work on.

1. *The Community Resource Inventory*. Has the community adequately inventoried its resources, and does the public have a sufficient understanding and appreciation of them?
2. *The “Community Audit”*. Is the community monitoring and assessing its likely future under its current growth management practices, and is it taking steps to change what it does not like?
3. *Policies for Conservation and Development*. Has the community established appropriate and realistic policies for land conservation and development in its Comprehensive Plan or Open Space Plan, and do these policies produce a clear vision of lands to be conserved?
4. *The Regulatory Framework*. Are the community’s zoning and subdivision regulations specifically structured to help implement its policies for land conservation?
5. *Designing Conservation Subdivisions*. Do local officials have experience in working cooperatively and effectively with subdivision applicants so that each new subdivision contributes to the overall network of conservation lands?
6. *Landowner Outreach and Stewardship*. Has the community leadership cultivated good working relationships with its major local landowners so that they are aware of

all their options for conserving land or blending conservation principles with new development?

7. *Stewardship of Conservation Lands*. Does the community have in place the arrangements required for successfully owning, managing, and using lands set aside for conservation purposes?

8. *Ongoing Education and Communications*. How are local officials and the general public maintaining their knowledge of the state-of-the-art in managing growth to conserve land?

Simply asking these questions is likely to stimulate productive thought about subjects that are typically not in the forefront of issues on the minds of many local officials, who are generally too busy dealing with day-to-day affairs to keep one eye focused on the horizon. These questions can therefore help people see gaps in their community's current approach, and can help them propose mid-course corrections to the direction in which they are presently heading. It is my observation that many communities with moderate to high growth rates are essentially drifting toward a future of haphazard suburbanization, which is inevitably produced by implementing conventional zoning and subdivision codes that are inherently visionless.

### **Relating Open Space Planning to Updated Zoning and Subdivision Ordinances**

Even though most local governments in developing areas have not yet created an overall land-use planning framework into which "conservation zoning" would fit, some are beginning to do so, and all should follow their leads. It is highly regrettable that William H. Whyte's 30-year old dream of linking open spaces in new subdivisions into an interconnected network of conservation lands, as expressed in his seminal volume *Cluster Development* (Whyte, 1964), remains largely unfulfilled. The potential for creating such a network of open space still exists in many municipalities, however, and this concept lies at the core of the *Growing Greener* program.

Through this state-wide effort in conservation planning education, local officials are learning about the need for integrating their land-use plans and ordinances, from conservation elements of *Comprehensive Plans*, to conservation zoning provisions, to conservation development design standards in local subdivision ordinances. I view this program as essentially an extension and adaptation of the work of Ian McHarg and Frederick Steiner, based on the ecological principles articulated in *Design with Nature* (McHarg, 1991) and *The Living Landscape* (Steiner, 1991).

Conservation lands that communities are able to protect through this approach typically encompass a wide variety of resources, including wildlife travel corridors and breeding/feeding grounds, mature woodlands, stream valleys, and prime farmland. One of the program's principal goals is to encourage the more progressive municipalities in each growth-impacted county to become "Conservation Leadership Communities", to demonstrate the effectiveness and practicality of these techniques. When these techniques have been in place for a number of years, with landowners being permitted to develop their land at limited, moderate, or full densities, in a manner that respects both resource values and property values according to an overall community-wide "green plan", an interconnected network of resource lands can be protected in which farmers, wildlife, naturalists, and hikers may comfortably coexist.

### **Recommended Sequence of Four Work Stages**

In working with individual municipalities, the sequence of four work stages that is generally recommended under the *Growing Greener* program is as follows:

- 1) *Performing a Community "Audit"*. This tool can take any of three forms. Two involve projecting trends to show what the community is likely to become or what it is likely to look like if current land-use policies continue to be implemented. These projections can be purely numerical (such as estimates of the ultimate population when all vacant, buildable land is developed), or pictorial (such as "build-out maps" showing the spread of suburban houselots and streets throughout the remaining undeveloped portions of the municipality). A third approach to the "audit" involves examining existing zoning and subdivision ordinances and preparing a written evaluation providing a constructive critique of their weaknesses and how those deficiencies could be corrected. This last approach is the one most frequently employed in the *Growing Greener* program.
- 2) *Supplementing the Comprehensive Plan* to include a *Community-wide "Map of Potential Conservation Lands"*, including both "Primary Conservation Areas" (wetlands, floodplains, and slopes exceeding 25%) and "Secondary Conservation Areas" (otherwise buildable woodlands, farmland, riparian corridors, cultural landscapes and scenic viewsheds, and other noteworthy features that help define the municipality's special character). The revised plan should also include a description of specific zoning and subdivision ordinance language needed to ensure that this "greener vision" map illustrating the community's future open space network will be implemented as each undeveloped parcel is proposed for development.
- 3) *Updating the Subdivision Ordinance* to include several critical new requirements for all new subdivisions such as a detailed *Natural Resources/Site Analysis Plan*, a *Sketch Plan* or a *Two-stage Preliminary Plan* (Conceptual and Detailed), plus a conceptually innovative design process requiring that conservation areas be identified first, followed by house site locations, before streets and lot lines may be drawn in, and
- 4) *Amending the Zoning Ordinance* to include a variety of mechanisms, as described later in this paper.

The above sequence of actions or amendments is ideally recommended because it is very important, at the outset, that the community should have a clear understanding of what it will grow to become if it does not chart a mid-course correction in the way that its development patterns are proceeding. It is equally necessary that local officials and residents work together to produce a shared vision for the direction in which they would like their ordinances to take the community, before beginning the process of code revision.

After completing the "audit", securing agreement on community goals for open space conservation and development in the *Comprehensive Plan*, and deciding on the principal subdivision design methodologies involved in achieving those goals, municipalities are generally better equipped to deal with the more detailed work involved in their zoning revisions. Apart from the logic that this progression seems to offer, another possible advantage is that the dimensional details of the zoning will be seen in a broader perspective, as the fairly minor items which they really are. When viewed in the context of a community-wide open space network of conservation lands, the relative insignificance of these details will hopefully become apparent. When municipal officials deal with zoning provisions in the abstract, they frequently tend to place more emphasis on such details than is warranted, and often spend extended periods debating the merits of this number or of that dimension. By working from the "big picture" of Potential Conservation Lands, to the intermediate level of the methodology involved in analyzing and laying out development

proposals, before getting into the minutiae of the zoning ordinance, local officials and residents are often more productive and better satisfied with the ultimate results.

#### **Four Inter-related “Toolboxes” for Creating Greener Communities**

Within the above-described work stages, the *Growing Greener* program utilizes four “toolboxes” of complementary techniques to help municipalities implement their conservation goals, as outlined below. The techniques in each of the toolboxes should be integrated so that the location of the open space laid out pursuant to the conservation subdivision regulations (Toolbox C) is controlled by overall standards contained in the conservation zoning provisions (Toolbox D), which in turn should relate back to the *Community-wide Map of Potential Conservation Lands* in the *Comprehensive Plan* (Toolbox B). In this way municipalities can initiate a true planning process that will ultimately result in the creation of an interconnected network of open space. Some communities and park agencies are also discovering the value of this technique as a way of requiring developers to buffer their subdivisions from abutting parkland or active farmland, in what is commonly called an “adjoining lands strategy”, wherein at least part of the conservation areas are required to be located along the park or resource boundary.

#### **Toolbox A. The Community “Audit”: Envisioning the Future**

The “community audit” visioning process helps local officials and residents see the ultimate result of continuing to implement current land-use policies. This process helps to promote discussion about how current trends can be modified so that a greener future may be ensured.

Sadly but true, the future which faces most communities with standard zoning and subdivision codes is to witness the systematic conversion of every unprotected acre of buildable land into developed uses.

The main reason subdivisions typically consist of nothing more than houselots and streets is that most local land-use ordinances ask little, if anything, with respect to conserving unconstrained land as open space or providing neighborhood amenities.

Most local ordinances allow or encourage standardized layouts of “wall-to-wall houselots.” Over a period of decades this process produces a broader pattern of “wall-to-wall subdivisions” (see Fig. 1). No community actively plans to become a bland suburb without open space. However, most zoning codes program exactly this outcome, aided and abetted by conventional subdivision ordinances whose design standards typically encompass only streets, drains, and lot lines.

Municipalities can perform audits to see the future before it happens, so that they will be able to judge whether a mid-course correction is needed. A community audit can entail any or all of the following three work elements:

1. *Numerical Analysis of Development Trends.* The first step involves a numerical analysis of growth projections, both in terms of the number of dwelling units and the number of acres that will probably be converted into houselots and streets under present codes.
2. *“Build-Out” Map.* This element entails plotting future development patterns on a map of the entire municipality in a realistic manner (see Figure 2). Alternatively, the “build-out” map could focus only on selected areas in the municipality where development is of the greatest

immediate concern, perhaps due to the presence of special features identified in the comprehensive plan or vulnerability due to development pressures.

*3. Regulatory Evaluation.* This element consists of an assessment of the community's current land-use regulations, identifying their strengths and weaknesses and offering constructive recommendations about how they can incorporate the conservation techniques described in this booklet. It should also include a realistic appraisal of the extent to which private conservation efforts are likely to succeed in protecting lands from development through various nonregulatory approaches such as purchases or donations of easements or fee title interests.

The above approaches are more fully described in Chapter 2 of the *Growing Greener* workbook.

### **Toolbox B. Comprehensive Plan Revisions: *Map of Potential Conservation Lands***

After completing the community "audit", the second work stage typically involves supplementing the Comprehensive Plan. Although different communities usually exhibit a wide range of completeness in their Comprehensive Plans, these documents generally include a series of resource inventory maps which can form the core material for preparing a *Community-wide Map of Potential Conservation Lands*, which will establish an overall direction and goal for municipal growth that the ordinances can be carefully updated to implement.

Such a map is vitally important to any community interested in conserving an interconnected network of open space. This map serves as the principal tool that guides decisions regarding which land to protect in order for the network to eventually take form and have integrity. A composite *Map of Potential Conservation Lands* starts with detailed inventories of the natural and historic resources contained in the community's existing planning documents. The next logical step is to pull together all that information and to create a composite map. In some communities, however, the existing resource maps need to be supplemented with additional data layers before this composite map can be produced.

On this composite *Map of Potential Conservation Lands* a variety of resources is typically rendered in various shades of green or other related colors. This map, which might be either regulatory or advisory in nature, would typically be divided into the following categories:

- Primary Conservation Areas including lands with severe environmental constraints making them essentially unfit for development, such as wetlands, floodplains, and slopes exceeding 25%.
- Secondary Conservation Areas encompassing lands with locally significant or noteworthy features that constitute much of the community's resource base and which frequently contribute to its special character, such as stream valleys, moderately steep slopes, mature woodlands, wildlife habitats and travel corridors, fields and pastures with soils rated prime or of statewide importance or situated within in the public viewshed as seen from existing public roads, historic structures and archaeological sites (including ruins and cellarholes), stone walls, noteworthy rock formations, established trails, etc. Usually these resource areas are totally unprotected and are simply zoned for one kind of development or another.
- Existing Protected Areas consisting of eased land, public parks, conservancy properties, etc.).

The process for creating the community-wide *Map of Potential Conservation Lands* is as follows:

- A base map is first prepared on which are shown all existing streets and roads, all parcel boundaries, all existing protected lands, and all Primary Conservation Areas.
- Clear acetate sheets showing each kind of Secondary Conservation Area are then placed on top of the base map in an order reflecting the community's preservation priorities (as determined through public discussion).
- This overlay process will reveal certain situations ("co-occurrences") where two or more conservation features appear together (such as woodlands and wildlife habitats, or farmland and scenic viewsheds). It will also reveal gaps where no features appear.

Although this exercise is not an exact science, it frequently helps local officials and residents visualize how various kinds of resource areas are related to one another, and enables them to tentatively identify both broad swaths and narrow corridors of resource land that could be connected and protected in a variety of ways. Figure 3 shows a portion of a map prepared for one Pennsylvania township which has followed this approach.

The importance of this kind of map is that it could form the framework around which new development is either encouraged or required to be designed. Such an approach would almost certainly ensure that the conservation network which will evolve in any participating municipality will be interconnected, and that it will encompass a substantial amount of land that would otherwise be subdivided, cleared, graded, and developed. As such, it could be the unifying concept map that defines the community's future pattern of conservation and development, in a rational and orderly manner.

Figure 4 shows how certain resource areas in three adjoining subdivisions have been designed to connect, and illustrates the way in which the *Map of Potential Conservation Lands* can become a reality.

Figure 5 provides a bird's-eye view of a landscape where an interconnected network of conservation lands has been gradually protected through the steady application of conservation zoning techniques and conservation subdivision design standards.

Even though this process may produce a map on which all or most of the land within certain individual parcels is colored over, indicating that nearly every part of the property contains one type of resource area or another, there is an absolute commitment under the *Growing Greener* approach that each property owner may exercise his right to develop his land to the full density allowed under the community's zoning ordinance. In other words, no reduction in lot yield is needed, and no "takings" occurs.

Landowners wishing to develop their properties would either be encouraged or required, under updated zoning provisions, to utilize flexible "conservation design" techniques to keep houselots away from those special areas, locating new homes, lawns, and streets within those parts of their properties containing the least significant resource areas, as indicated in a ranked list of evaluation criteria for potential conservation land, contained within the model subdivision ordinance language in the *Growing Greener* workbook appendix.

This approach allows habitats which are currently fragmented into multiple ownerships to remain more intact after development, and for blocks of farmland or special woodlands to remain more



whole. It is also a powerful tool for greenway planning, enabling continuous ribbons of open space to be created along streams, for example, as each riparian parcel is subdivided. To be effective, such maps should be referenced in zoning regulations, and treated as a “rebuttable presumption” that developers must deal with seriously (which includes an opportunity for them to suggest adjustments to the “potential conservation areas” pre-identified on this map, respecting the spirit of the community’s open space network goals). The above approaches are described in further detail in Chapter 3 of the *Growing Greener* workbook.

Another very important aspect of updating Comprehensive Plans is the expansion of their “implementation” chapters to include a brief description of the specific zoning and subdivision ordinance techniques necessary to ensure that the Plan’s ultimate goal of protecting conservation networks becomes a reality. These techniques are detailed in Toolboxes C and D, below.

### **Toolbox C. Subdivision Ordinance Revisions**

Upon completing this “greener visions” map, the most appropriate next step, in our view, would be to draft possible revisions to the community’s Subdivision Ordinance, under which most of the critical layout decisions are taken by developers and their site designers. This third toolbox involves the specific procedures for analyzing each new subdivision site, and the methodology for preparing a conservation-based development plan wherein the conservation areas will be related to the community-wide *Map of Potential Conservation Lands* in order that an interconnected network of open space will ultimately be preserved. Designing subdivisions around the central organizing principle of land conservation is not difficult. However, it is essential that ordinances contain clear standards to guide the conservation design process so that subdivision applicants may understand the community’s conservation priorities.

The highlights of this part of the program include the following elements:

- ***Existing Resources/Site Analysis Plan***: Chief among the basic procedures required to be followed in the design of any sensitive subdivision is the preparation of a comprehensive *Existing Resources and Site Analysis Plan* (see Figures 7 and 8). This critical element identifies all the special characteristics of the subject property, from unbuildable areas such as wetlands, floodplains and steep slopes, to other kinds of land that are developable but which contain certain noteworthy features meriting the small amount of additional effort needed for their conservation. Such features might include mature or healthy and diverse woodlands, wildlife habitats critical for breeding or feeding, hedgerows, prime or highly productive farmland, scenic views into and out of the site, and historic buildings in their rural context.

This plan is typically prepared by a landscape architect and would sometimes be based on recommendations from conservation biologists, agricultural specialists, and historic preservationists. It tells reviewers virtually everything they need to know about the property in terms of the elements listed above in the *Map of Potential Conservation Lands*. Whereas that map is drawn to a scale appropriate for a community-wide document, the *Existing Resources/Site Analysis Plan* is typically drawn to a scale of one inch equals 100 or 200 feet. It reflects a thorough understanding of the site by those who have walked it extensively, so that even the location of large trees or unusual geological formations can be identified. This

is arguably the most important document in the subdivision design process, as it is the factual foundation upon which all design decisions are based.

- **On-Site Visit:** With the above site analysis map in hand, local officials then walk the property with a view toward offering suggestions about the recommended location of Secondary Conservation Areas. Without the benefit of experiencing the property in a three-dimensional manner (as opposed to reading a two-dimensional plan in a meeting room), it is extremely difficult to judge the appropriateness of proposed layouts.
- **Sketch Plan:** After the *Existing Resources/Site Analysis Plan*, the *Sketch Plan* is the next most important document in the entire subdivision process. This is the step where the overall concept is outlined, and can even take the form of a simple “bubble map” showing areas of proposed development and areas of proposed conservation. *Sketch Plans* may be quite simple, and could be prepared on white tracing paper as an overlay sheet to be placed on top of the *Existing Resources/Site Analysis Map*, so that everyone can clearly see how well (or how poorly) the proposed layout avoids potential conservation lands with resources ranked highly on the priority list in the subdivision regulations. Ideally the proposed development “footprint” on the *Sketch Plan* should dovetail with the most significant or noteworthy resources documented on the *Existing Resources/Site Analysis Plan*. This section of the ordinance should also provide more evaluation criteria for local officials to follow, so that everyone knows the parameters for approving or disapproving the *Sketch Plan*.

It is absolutely essential that this stage occur before applicants spend large sums on preparing the substantially-engineered drawings that typically constitute the so-called “Preliminary Plan”. Once a certain layout has been engineered, developers are understandably reluctant to modify their drawings in any substantial way. After agreement is reached on the *Sketch Plan*, the applicant moves to the *Preliminary Plan*, containing a substantial amount of engineering data and detailed design.

Even in states where the planning legislation does not specifically authorize *Sketch Plans* (as is the case in Pennsylvania), municipalities might wish to consider this approach anyway. In Chester County, PA, for example, a large number of townships have been requiring *Sketch Plans* in their subdivision ordinances for many years, and have found that developers have been willing to submit them. Although the state enabling legislation does not grant municipalities the authority to require such a “third step” (in addition to the preliminary and final plans), practical experience in that county is that developers have not been inclined to press this point legally and start off on an acrimonious foot. Most developers recognize that *Sketch Plans* can represent time very well-spent, because they enable the larger issues to be resolved in broad, outline form before tens of thousands of dollars are spent engineering the so-called “Preliminary Plans”. In order for the *Sketch Plan* to become an accepted part of the process in these kinds of situations, it is recommended that it be kept very simple and inexpensive to prepare -- as is the “bubble map” on a tracing-paper overlay sheet.

- **Preliminary Plan as Two-Phases -- Conceptual and Detailed:** In states where municipalities are not specifically authorized to require *Sketch Plans*, and in communities where local officials are hesitant to include *Sketch Plan* requirements in their codes for this or other reasons, such submissions must remain entirely voluntary. When applicants in such situations decline the opportunity to submit a *Sketch Plan*, it might well be legally possible to divide the normal Preliminary Plan process into two phases. The first phase, taking 30

days of the total time allowed for Preliminary Plan reviews, would consist of an unengineered “*Conceptual Preliminary Plan*”, in which the overall layout of conservation areas, streets, and houselots is shown to scale, as an overlay to the *Existing Resources/Site Analysis Plan*. This approach would enable local officials to examine the relationship between the elements shown on the “*Conceptual Preliminary Plan*” and the location of features depicted on the site analysis plan. As mentioned above, it is essential that this stage occur before applicants incur large expenditures preparing substantially-engineered “Preliminary Plans” because that financial investment generally locks them into their original layouts. Once the “*Conceptual Preliminary Plan*” has been approved, applicants move to the second phase, that of preparing a “*Detailed Preliminary Plan*”, containing all the data normally required on so-called “Preliminary Plans”.

• **Simplifying the Preliminary Plan Stage:** If a municipality is reluctant, for any reason, either to require simple sketch plans or to create a two-phase preliminary plan process, a third alternative exists. This alternative would be to greatly simplify the so-called “Preliminary Plan” and make it a truly preliminary document, like a fairly elaborate -- but only lightly engineered -- *Sketch Plan*. (This is, in fact, the way the model ordinance language in the *Growing Greener* appendix has been drafted in Pennsylvania.) This approach returns back to the original intent of many state legislatures when they first enacted their enabling legislation creating the “Preliminary Plan” stage, an intent which has become clouded over the years as municipalities have gradually added more and more requirements to this initial presentation.

• **Four-Step Design Approach:** Production of the *Existing Resources and Site Analysis Plan* sets the stage for beginning a four-step design process which has been proven to be effective in laying out new full-density developments where all the significant natural and cultural features have been preserved. Simply stated, the four steps consist of:

1. identifying potential **conservation lands**, both Primary (“unbuildable”) and Secondary (unconstrained land, such as prime agricultural soils, mature woodlands, historic/cultural features, etc.); then
2. locating **house sites**, at a respectful distance from resource lands; then
3. aligning **streets and footpaths**; and then
4. setting in the **lot lines** ...*in that order*.

These four steps are more fully described below, with illustrations of a site zoned for 21 new houselots.

### ***Step One: Identifying Conservation Areas***

The first step, which involves the identification of open space worthy of preservation, is divided into two broad classes of resource areas relating back to the community-wide *Map of Potential Conservation Lands* in the *Comprehensive Plan*. They are: *Primary Conservation Areas* (Fig. 6) limited to regulatory wetlands, floodplains and steep slopes, and *Secondary Conservation Areas* (Fig. 7) including those unprotected elements of the natural and cultural landscape that deserve to be spared from clearing, grading, and development. On the particular site illustrated here, those features include mature woodlands, “serpentine barrens” rock outcroppings with their associated semi-rare wildflowers, the corner meadow and views across it into the property from existing township roads, and several hedgerows bordering the old fields.

The act of delineating conservation areas also defines *Potential Development Areas*, which occupy the balance of the site (Fig. 8). This completes the first step and virtually ensures that the site's fundamental integrity will be protected, regardless of the actual configuration of houselots and streets that will follow. In other words, once the "big picture" of conservation has been brought into focus, the rest of the design process essentially involves only lesser details. Those details, which are of critical importance to developers, realtors, and future residents, are addressed during the last three steps.

### ***Step Two: Locating House Sites***

The second step involves locating the approximate sites of individual houses, which for marketing and quality-of-life reasons should be placed at a respectful proximity to the conservation areas, with homes backing up to woodlands for privacy or enjoying long views across open fields or wildflower meadows (Fig. 9). In a full-density conservation plan the number of house sites would be the same as that shown on the "Yield Plan" illustrated in Fig. 14 (21 lots in this example), but the integrity of the site would not be lost and residents' views would not necessarily be of their neighbors' garage doors across the street or of other people's pressure-treated decks facing into their own back yards.

### ***Step Three: Aligning Streets and Trails***

The third step consists of tracing a logical alignment for local streets to access the 21 homes and for informal footpaths to connect various parts of the neighborhood, making it easier for residents to enjoy walking through the open space, observing seasonal changes in the landscape and possibly meeting other folks who live at the other end of their subdivision (Fig. 10). The opportunity for a streamside greenway as part of a larger community-wide network of open space is also obvious.

### ***Step Four: Drawing in the Lot Lines***

The final step is simply a matter of drawing in the lot lines, perhaps the least significant part of the process. Successful developers of conservation subdivisions know that most buyers prefer homes in attractive park-like settings, and that views of protected open space enable them to sell lots or houses faster and at premium prices (Fig. 11). Such homes also tend to appreciate more in value, compared with those on lots in standard "cookie-cutter" developments offering no views or nearby open space.

This approach reverses the sequence of steps in laying out conventional subdivisions, where the street system is the first thing to be identified, followed by lot lines fanning out to encompass every square foot of ground into houselots. When municipalities require nothing more than "houselots and streets," that is all they generally receive. However, when one begins the subdivision design process with the determination of natural and cultural resource areas as the first step, and when the ordinance also requires that a significant proportion of the unconstrained land be designated as open space, officials can effectively encourage conservation subdivision design. The protected land in each new subdivision would then become building blocks adding new acreage to community-wide networks of interconnected open space each time a property is developed.

In other words, when such open space is required to be protected as a precondition for achieving full density, subdivision applicants quickly learn how to design around all the special features of their properties. When following this four-step approach, it is nearly impossible for applicants to produce a truly inferior or simply conventional plan. In fact, to the extent that the property contains elements of the community-wide network of conservation lands, the plan is likely to be at least fairly good. (The above approaches are fully described in Chapter 5 of the *Growing Greener* workbook.)

#### **Toolbox D. Zoning Ordinance Revisions**

The conservation planning concepts that are typically recommended for zoning ordinances under the *Growing Greener* program include the following items:

- A “Menu of Choices” providing a greater variety of options for landowners, all of which would confer distinct advantages to the municipality
- Density *disincentives* to actively discourage development without open space
- Requiring conservation design within certain overlay districts where the municipality feels that open space preservation (for active or passive purposes) is essential
- Possible density incentives to encourage public access to conservation lands, and to encourage the endowment of maintenance funds
- Requiring management plans for conservation lands
- Classifying certain “menu items” as Permitted or Conditional Uses
- Replacing blanket zoning density with strong new “net-out” provisions related to actual environmental constraints existing within a proposed development site (a form of “performance zoning” generally favored by the courts).

These zoning approaches are described below:

• **A “Menu” of Choices through “Multi-Optioned Zoning”:** Much could be gained by permitting landowners to enjoy a wider range of alternative options for conservation and development of their properties than standard “Euclidean” zoning typically allows. Under the conventional approach, a “one size fits all” provision applies to all properties within a residential zoning district, effectively preventing many creative solutions and resulting in the deadening repetitiveness of standard cookie-cutter subdivisions covering the landscape, each one mechanically stamped out with substantially the same old die. Because each property and each landowner is distinctly different, it makes sense that a community’s zoning should allow a variation of responses to the development question, provided that all the possible outcomes would benefit the municipality in one way or another.

Communities wishing to break the cycle of “wall-to-wall houselots” need to consider modifying their zoning in two ways. First, to actively encourage subdivisions which set aside at least 50 percent of the land as permanently protected conservation areas. And second, to incorporate substantial density disincentives that actively discourage developers from producing more “cookie-cutter” layouts with little or no functional open space.

**Density Determination.** Under the *Growing Greener* program, landowners and developers choose between two alternative approaches for determining their site’ base density or lot yield.

- **Formulaic Approach.** The applicant calculates the acreage in various categories subject to various physical constraints, applies special “Environmental Weighting Factors” to those acreages, and determines the number of “net buildable acres” on which density is to be

based. This approach is further described later in this paper under the heading “Net-Out” Provisions and “Performance Zoning” Criteria.

- “Yield Plan” Approach. A very simple conventional lot layout concept plan is produced in a realistic manner, truly reflecting site constraints such as steep slopes, wetlands, floodplains and (in unsewered areas) soils suitable for septic disposal. This layout is illustrated in Fig. 14. In unsewered areas, officials should require a 10 percent sample of the most questionable lots -- which they would then select -- to be tested for septic suitability. Any lots that fail would be deducted and the applicant would have to perform a second 10 percent sample, etc.

The “menu” approach offered through the *Growing Greener* program effectively expands the choices available to landowners and developers compared with the more limited options available under the typical existing zoning ordinances. The principal characteristics of these options (in terms of lot yield, minimum percentage of open space, and lot size minima and maxima) are summarized in Table 1 below.

The basic option, “Option 1” (Density-Neutral with Pre-existing Zoning), allows landowners to achieve full density provided that a conservation subdivision design is proposed, with substantial (often 50 percent) undivided open space, based on net buildable land area (i.e., in addition to unbuildable lands such as wetlands, floodplains, and slopes greater than 25 percent). See Fig. 15.

A second option, “Option 2” (Enhanced Conservation and Density), provides a small density incentive for layouts which provide higher proportions of protected open space (at least 60 percent, again in addition to unbuildable land). See Fig. 16.

A third option, “Option 3” (Estate Lots) meets any demand there might be for large “estate lots”, with no undivided open space (except for possibly a greenway corridor connection along a stream valley or other natural feature, where appropriate). However, this option would be subject to a density reduction with fewer houselots than the district’s base density. See Fig. 17.

A fourth option, “Option 4” (Country Properties), is designed to encourage lower-density development wherein country properties of at least ten acres would be made more attractive by offering such incentives as relaxing street construction standards (to permit gravel-surfaced “country lanes” that would essentially be shared driveways). Another incentive would be to allow one or two accessory dwelling units per country property, subject to certain design standards pertaining to maximum floorspace and architectural form. Further subdivision is effectively prevented through conservation easements, which also protect the integrity of the conservation lands outside the individual building envelopes. See Fig. 18.

A fifth option, “Option 5” (Hamlet or Village), allows a significantly larger density bonus than offered under Option 2, but with the stipulation that an even greater percentage of open space be set aside permanently. In this “neo-traditional” design option, the four-step approach is modified so that the layout of streets and squares precedes house site location, as streetscapes and formal open spaces assume a higher degree of importance in such

neighborhoods. A fully-illustrated set of design standards for “village and hamlets” appear in an appendix to the *Growing Greener* workbook to provide a clear understanding of street layout patterns, civic open space provision, and building siting that reflects the principal physical characteristics of small settlements dating from the 19th century. See Fig. 19.

It is also possible to combine two or more of the above options. As shown in Fig. 20, the “country property “ option can be successfully combined with the “village/hamlet” option, enabling the applicant to locate much of the open space within large private parcels as “non-common” land. This design solution provides multiple advantages, among them conserving roadside vistas, allowing the small-lot community to be situated in a less visible position, and enabling the developer to maximize his return on the majority of the conservation land while still providing active and passive open space for the village residents themselves.

**Table 1.** Yields, Open Space, and Lot Sizes on a 63-acre Tract with 40 Acres Adjusted

<b>Option</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Yield (lots)	21	28	10	5	42
% Open Space	50%	60%	-	-	70%
Max. Lot Size	40,000	24,000	-	-	12,000
Min. Lot Size	20,000	12,000	4 ac.	10 ac.	6,000

\* The above numbers are based on rural zoning requirements of 82,000 sq. ft. of land per dwelling, Adjusted Tract Acreage (excluding unbuildable portions). readers should note that multiple density options can be offered at many different levels of base density. For example, the *Growing Greener* workbook contains a detailed table showing lot sizes and open space percentages for all or most of these five options where the original “base density” is as high as two, three, or four dwellings per acre.

Deliberately absent from this “menu” of options is the conventional “cookie-cutter” subdivision with no designated open space, at the normal base density. It is a central tenet of the *Growing Greener* approach that the principal problem with conventional “Euclidean” zoning is that it allows developers full density, by-right, for unimaginative, cookie-cutter layouts which convert every acre of land in their subdivisions into lawns and cul-de-sacs. That type of “meat cleaver” approach, in which all woodlands, fields, pastures, wetlands, and floodplains are cut up into into a simplistic checkerboard of houselots and streets, should never be rewarded with full density, but should rather be allowed only with a density reduction that is sufficiently large to discourage most developers from continuing that highly land-consumptive practice, which is frequently very destructive of the community’s resource base.

- **Density Disincentives:** As noted above, the land-consuming “Options 3 and 4” alternatives are subject to a density penalty because they convert all land into houselots and streets. By failing to designate any undivided open space (except perhaps for narrow “greenway corridors”), these kinds of layout effectively prevent any kind of coordinated management for the woodlands or meadows within the larger houselots (which are typically cleared or modified in ways that reduce their value for habitat, and which suburbanize the formerly rural landscape). Developers who wish to pursue the large-lot option may continue to do so, with lots that would be larger than they would otherwise have created. Although the municipality would not see its open space network grow in a formal manner, it would benefit in other ways, such as by the reduction in traffic and schoolchildren that fewer homes would generate, and by providing some opportunities to accommodate the highest end of the housing market which values extreme privacy and seclusion.

- **Requiring Conservation Design:** Certain areas of the community, such as land along stream valleys and ridgelines, and also around historic village centers, might be subject to a special overlay zoning provision limiting the alternatives to Options 1 and 2, with standards for locating the open space in certain parts of the property. These would typically be areas where the municipality would not like to take the risk of a developer proposing a



conventional Option 3 or 4 subdivision with no specifically protected, undivided open space. Other examples of where such a requirement would be appropriate would be for parcels abutting any public parklands, wildlife refuges, or conservancy preserves, or any active, productive farmland where new suburban neighbors can be expected to object to normal agricultural operations.

- **Limited Density Incentives:** To encourage certain desirable results where the legislative authority to require them is absent or subject to debate, communities should consider adding provisions offering density incentives. Examples of what such incentives could be used for are the creation of endowment funds to finance perpetual maintenance of the conservation areas when they are gifted to land trusts, and public access to trail corridors that may traverse a proposed subdivision, or donation of subdivision open space to the municipality for public recreation purposes.

- **Management Plans for Conservation Lands:** The land which is not divided into houselots should be managed comprehensively (usually by a homeowners' association) to maintain or enhance the ecological health of the habitat. The Trust has prepared a set of land management guidelines for the subdivision open space in Lower Merion Township (the first municipality in Pennsylvania to require conservation subdivision design). One of the lessons learned there is the maintenance difficulties that are built into arrangements where the "open space" consists of parts of large individual back yards subject to conservation easements. Such would be the case in Option 3 and 4 subdivisions under the above hierarchy, which is a principal reason they should generally be discouraged. It should be understood that in Options 1, 2, and 5 subdivisions with undivided open space, homeowner associations have the responsibility for maintenance, taxes, and liability. These issues, and typical concerns about HOAs, are addressed below, in the "Question & Answer" section of this paper.

- **"Net-Out" Provisions and "Performance Zoning" Criteria:** Communities should consider modifying the way they currently allow density to be calculated in new subdivisions. Rather than dividing gross acreage by a certain density factor (such as one or two acres per dwelling), they could require that the acreage used for density calculation purposes be the net land area which is deemed to be appropriate for residential construction. The courts in Pennsylvania have praised municipalities which have adopted performance-related zoning which assigns very low "density factors" to lands that are severely constrained, moderately low density factors to lands that are moderately constrained, and which allows full development density (base density) on unconstrained lands. The logic of this approach has appealed to the justices, who have lauded such ordinances as being very sensible and fair to all parties involved.

Examples of a possible "net-out" approach are contained in Section 4.4.1 of the *Growing Greener* workbook. Briefly stated, the acreage of land in each category is measured by the applicant's surveyor or engineer, and that acreage figure is then multiplied by the appropriate "Environmental Weighting Factor". The product of that exercise is then multiplied by the base density allowed in the zoning district. In other words, twelve acres of floodplain would produce a value of 6.0 (12 acres times the EWF of 0.5), meaning that only six of the twelve floodprone acres could be counted toward density. In a zoning district where the base density is two acres per dwelling, that would qualify the applicant for three houses, provided (of course) that they were all located outside the floodplain.

## **Supplementary Approaches: “Landowner Compacts”**

In situations where the municipality’s goal may include conserving an entire parcel of privately owned land, three other options exist. The first is to enquire whether the owner could benefit from a reduction in federal income or estate taxes by donating the land or selling it at a bargain price to the municipality or a land trust. Failing that, the concept of a “landowner compact” should be explored, in which the owner would join with his or her abutters to create a unified plan for their combined properties. Under this approach the development rights from the subject parcel would be shifted to and exercised on a neighboring parcel, with the net proceeds of the total development being shared proportionately among all co-operating landowners, according to the amount of value each contributes to the whole. The third option would be to purchase the property at fair market value with state, county, or local bond funds. However, experience has shown this approach to be very limited in its potential scope when the land is zoned at suburban densities, rather than at rural-agricultural densities (typically 20 to 40 acres per dwelling).

## **Frequently Asked Questions About Conservation Subdivision Design**

### *1. Does this conservation-based approach involve a “taking”?*

Not at all. People who do not fully understand this conservation-based approach to subdivision design may mistakenly believe that it constitutes “a taking of land without compensation.” This misunderstanding may stem from the fact that conservation subdivisions, as described in this paper, involve either large percentages of undivided open space or lower overall building densities.

There are two reasons why this approach does not constitute a “taking.” First, no density is taken away. Conservation zoning is fundamentally fair because it allows landowners and developers to achieve full density under the municipality’s current zoning—and even to increase that density significantly—through several different “as-of-right” options. Of the five options permitted under conservation zoning, three provide for either full or enhanced densities. The other two options offer developers the choice of lowering their densities and of increasing their lot sizes. Although conservation zoning precludes full-density layouts that do not conserve open space, this is legal because there is no constitutional “right to sprawl.”

Second, no land is taken for public use. None of the land which is required to be designated for conservation purposes becomes public (or even publicly accessible) unless the landowner or developer wants it to be. In the vast majority of situations, municipalities themselves have no desire to own and manage such conservation land, which they generally feel should be a neighborhood responsibility. In cases where local officials wish to provide public recreational facilities (such as ballfields or trails) within conservation subdivisions, the municipality must negotiate with the developer for the purchase of that land on a “willing seller/willing buyer” basis. To facilitate such negotiations, the *Growing Greener* model zoning provisions have been written to include density incentives encouraging developers to designate specific parts of their conservation land for public ownership or for public access and use.

### *2. How can a community ensure permanent protection for conservation lands?*

The most effective way to ensure that conservation land in a new subdivision will remain undeveloped forever is to place a permanent conservation easement on it. Such easements run with the chain of title, in perpetuity, and specify the various conservation uses that may occur on

the property. These restrictions are separate from zoning ordinances and continue in force even if legal densities rise in future years. Easements are typically held by land trusts and units of government. Since political leadership can change over time, land trusts are the most reliable holder of easements, as their mission never varies. Deed restrictions and covenants are, by comparison, not as effective as easements, and are not recommended for this purpose. Easements can be modified only within the spirit of the original agreement, and only if the co-holders agree. In practice, while a proposal to erect another house or a country club building on the open space would typically be denied, permission to create a small ballfield or a single tennis court in a corner of a large conservation meadow or former field might well be granted.

### *3. How can on-site sewage disposal work with conservation subdivisions?*

The conventional view is that the smaller lots in conservation subdivisions make them more difficult to develop in areas without sewers. However, the reverse is true. The flexibility inherent in the design of conservation subdivisions actually makes them superior to conventional layouts in their ability to provide for adequate sewage disposal. Here are two examples:

- Utilizing the Best Soils: Conservation design requires the most suitable soils on the property to be identified at the outset, enabling houselots to be arranged to take the best advantage of them. If one end of a property has deeper, better drained soils, it makes more sense to site the homes in that part of the property rather than to spread them out, with some lots located entirely on mediocre soils that barely manage to meet minimal standards for septic approval. (Please see Fig. 21.)
- Locating Individual Systems within the Open Space. Conventional wisdom also holds that when lots become smaller, central water or sewage disposal is required. That view overlooks the practical alternative of locating individual wells and/or individual septic systems within the permanent open space adjacent to the more compact lots typical of conservation subdivisions, as shown in Figure 22. There is no engineering reason to require that septic filter beds must be located within each houselot. However, it is essential that the final approved subdivision plan clearly indicate which parts of the undivided open space are designated for septic disposal, with each lot's disposal area graphically indicated through dotted lines extending out into the conservation land. These filter beds can be located under playing fields or conservation meadows in the same way they typically occupy positions under suburban lawns. (If mound systems are required due to marginal soil conditions, they are best located in passive use areas such as conservation meadows where the grass is cut only once a year. Such mounds should also be required to be contoured with gently sloping sides to blend into the surrounding landscape wherever possible.)

Although maintenance and repair of these septic systems remains the responsibility of individual lot owners, it is recommended that HOAs be authorized to pump individual septic tanks on a regular basis (every three or four years) to ensure that the accumulated sludge never rises to a level where it can flow into and clog the filter beds. This inexpensive, preventive maintenance greatly extends the life of filter beds.

### *4. What are the ownership, maintenance, tax and liability issues?*

Among the most commonly expressed concerns about subdivisions which conserve open space are questions about who will own and maintain the conservation land, and who will be

responsible for the potential liability and payment of property taxes. The short answer is that whoever owns the conservation land is responsible for all of the above. But who owns this land? There are basically four ownership options, which may be combined within the same subdivision where that makes the most sense.

- Ownership Options.

- a. *Individual Landowner*

At its simplest level, the original landowner (a farmer, for example) can retain ownership to as much as 80 percent of the conservation land to keep it in the family as “non-common” open space. (However, at least 20 percent of the open space should be reserved for common neighborhood use by subdivision residents.) That landowner can also pass this property on to sons or daughters, or sell it to other individual landowners, with permanent conservation easements running with the land and protecting it from development under future owners. The open space should not, however, be divided among all of the individual subdivision lots as land management and access difficulties are likely to arise. Because the conservation design approach allows property owners to retain ownership of this “non-common” open space while receiving the proceeds from the full development density accommodated on other parts of the parcel, it has been called the “ultimate in property rights”.

- b. *Homeowners’ Associations*

Most conservation land within subdivisions is owned and managed by homeowners’ associations (HOAs). A few basic ground rules encourage a good performance record. First, membership must be automatic, a precondition of property purchase in the development. Second, zoning should require that bylaws give such associations the legal right to place liens on properties of members who fail to pay their dues. Third, facilities should be minimal (ball fields and trails rather than clubhouses and swimming pools) to keep annual dues low (often between \$150 and \$300 per annum). And fourth, detailed maintenance plans for conservation areas should be required by the municipality as a condition of approval. The municipality has enforcement rights and may place a lien on the property should the HOA fail to perform their obligations to maintain the conservation land. HOAs also avoid difficulties when their authority is confined to the common open space, and when they do not become involved in restrictions applying to private houselots (such as limitations prohibiting clothes lines, dog houses, etc.).

- c. *Land Trusts*

Although homeowners’ associations are generally the most logical recipients of conservation land within subdivisions, occasionally situations arise where such ownership most appropriately resides with a land trust (such as when a particularly rare or significant natural area is involved). Land trusts are private, charitable groups whose principal purpose is to protect land under its stewardship from inappropriate change. Their most common role is to hold easements or fee simple title on conservation lands within new developments and elsewhere in the community, to ensure that all restrictions are observed. To cover their costs in maintaining land they own or in monitoring land they hold easements on, land trusts typically require some endowment funding. When conservation zoning offers a density bonus, developers can donate the proceeds from the additional “endowment lots” to such trusts for maintenance or monitoring.

- d. *Municipality or Other Public Agency*

In special situations a local government might desire to own part of the conservation land within a new subdivision, such as when that land has been identified in a municipal open

space plan as a good location for a neighborhood park or for a link in a community trail network. Developers can be encouraged to sell or donate certain acreage to municipalities through additional density incentives, although the final decision would remain the developer's.

e. *Combinations of the Above*

As illustrated in Figure 23, the conservation land within new subdivisions could involve multiple ownerships, including (1) “non-common” open space such as cropland retained by the original farmer, (2) common open space such as ballfields owned by an HOA, and (3) a trail corridor owned by either a land trust or by the municipality.

• Maintenance Issues

Local officials should require conservation area management plans to be submitted and approved prior to granting final subdivision approval. In Lower Merion Township, Montgomery County, the community's “model” management plan is typically adopted by reference by each subdivision applicant. That document identifies a dozen different kinds of conservation areas (from woodlands and pastures to ballfields and abandoned farmland that is reforesting) and describes recommended management practices for each one. Farmland is typically leased by HOAs and land trusts to local farmers, who often agree to modify some of their agricultural practices to minimize impacts on nearby residents. Although ballfields and village greens require weekly mowing, conservation meadows typically need only annual mowing. Woodlands generally require the least maintenance: trimming bushes along walking trails, removing invasive vines around the outer edges where greater sunlight penetration favors their growth, and removing unsafe or diseased trees along public roadways.

• Tax Concerns

Property tax assessments on conservation subdivisions should not differ, in total, from those on conventional developments. This is because the same number of houses and acres of land are involved in both cases (except when part of the open space is owned by a public entity, which is uncommon). Although the open space in conservation subdivisions is taxed low because easements prevent it from being developed, the rate is similar to that applied to land in conventional subdivisions where the larger houselots are not big enough to be further subdivided. (For example, the undeveloped back half of a one-acre lot in a one-acre zoning district is subject to minimal taxation because it has no further development value.)

• Liability Questions

Special statutes in nearly every state protect owners of undeveloped land from liability for negligence if the landowner does not charge a fee to recreational users. A tree root or rock outcropping along a trail that trips a hiker will not constitute landowner negligence. To be sued successfully in Pennsylvania, for example, landowners must be found to have “willfully or maliciously failed to guard against a dangerous condition.” This is a much more difficult case for plaintiffs to make. Even so, to cover themselves against such situations, owners of conservation lands routinely purchase liability insurance policies similar to those that most homeowners maintain.

5. *How does this conservation approach differ from “clustering”?*

The *Growing Greener* conservation approach described here differs dramatically from the kind of “clustering” that has occurred in many communities over the past several decades. The principal points of difference are as follows:

- *Higher Percentage and Quality of Open Space*

In contrast with typical cluster codes, conservation zoning establishes higher standards for both the quantity and quality of open space that is to be preserved. Under conservation zoning, 50 to 70 percent of the unconstrained land is permanently set aside. This compares with cluster provisions that frequently require only 25 to 30 of the gross land area be conserved. That minimal open space often includes all of the most unusable land as open space, and sometimes also includes undesirable, left-over areas such as stormwater management facilities and land under high-tension power lines.

- *Open Space Pre-Determined to Form Community-wide Conservation Network*

Although clustering has at best typically produced a few small “green islands” here and there in any municipality, conservation zoning can protect blocks and corridors of permanent open space. These areas can be pre-identified on a comprehensive plan *Map of Potential Conservation Lands* so that each new development will add to—rather than subtract from—the community’s open space acreage.

- *Eliminates the Standard Practice of Full-Density with No Open Space*

Under this new system, full density is achievable for layouts in which 50 percent or more of the unconstrained land is conserved as permanent, undivided open space. By contrast, cluster zoning provisions are typically only optional alternatives within ordinances that permit full density, by right, for standard “cookie-cutter” designs with no open space.

Simply put, the differences between clustering and conservation zoning are like the contrast between a Ford Falcon and a Taurus.

#### *6. How do residential values in conservation subdivisions compare with those conventional subdivisions, and how well do those homes sell?*

Another concern of many people is that homes in conservation subdivisions will differ in value from those in the rest of the community. Some believe that because so much land is set aside as open space, the homes in a conservation subdivision will be prohibitively priced and the municipality will become a series of elitist enclaves. Other people take the opposite view, fearing that these homes will be smaller and less expensive than their own because of the more compact lot sizes offered in conservation subdivisions.

Both concerns are understandable but they miss the mark. Developers will build what the market is seeking at any given time, and they often base their decision about selling price on the character of surrounding neighborhoods and the amount they must pay for the land.

In conservation subdivisions with substantial open space, there is little or no correlation between lot size and price. These developments have sometimes been described as “golf course communities without the golf course,” underscoring the idea that a house on a small lot with a great view is frequently worth as much or more than the same house on a larger lot which is surrounded by other houselots, with no adjacent or nearby open space.

It is a well-established fact of real estate that people pay more for park-like settings, which offset their tendency to pay less for smaller lots. Successful developers take full advantage of their open space by situating at least part of it in highly visible locations such as along certain “single-loaded” street segments (with homes on one side only) , or in a visually prominent area such as a

village green or ballfield occupying a “terminal vista” or bordering the main entrance road. They also know how to market homes in conservation subdivisions by emphasizing the open space. Rather than describing a house on a half-acre lot as such, the product is described as a house with 20 and one-half acres, the larger figure reflecting the area of conservation land that has been protected in the development. When that conservation area abuts other similar land, as in the community-wide open space network, a further marketing advantage exists.

Many developers are finding that homes abutting open space sell more rapidly and can easily command premium prices from the outset. This has proven to be the case for lots backing up to wetlands at Hunters’ Green near Tampa, where buyers value the views of live oaks, Spanish moss, and egrets as much or more than views of the golf course. The benefit-cost ratio is much higher on the wetland-view lots for two reasons: the natural areas cost less to acquire than the high, dry land taken by the golf course, and cost nothing to “improve” (compared with typical \$2-4 million costs of creating golf facilities).

Another advantage is that homes in conservation subdivisions tend to appreciate faster than homes in conventional developments without open space. One study in Massachusetts showed a 17 percent differential in property value increases over a 20-year period between homes on 1/4-acre lots associated with 36 acres of common open space and comparable homes on 1/2-acre lots in a standard “checkerboard” development. Such advantages are cited by enterprising developers in their initial sales marketing.

### **Relationship of the *Growing Greener* Approach to Other Planning Techniques**

Successful communities employ a wide array of conservation planning techniques simultaneously, over an extended period of time. Complementary tools which a community should consider adding to its “toolbox” of techniques include the purchase of development rights, effective agricultural zoning, donations of sales to conservancies, the transfer of development rights; and “landowner compacts” involving density shifts among contiguous parcels. These and other techniques can be effective, but their potential for influencing the “big picture” is limited. The *Growing Greener* approach offers the greatest potential because -- unlike these other techniques -- it:

- does not require large public expenditures,
- does not require substantial “down-zoning”
- does not depend upon landowner charity,
- does not involve complicated regulations for shifting rights to other parcels, and
- does not depend upon the cooperation of two or more adjoining landowners to make it work.

Of course, communities should continue their efforts to preserve special properties in their entirety whenever possible, such as by working with landowners interested in donating easements or fee title to a local conservation group, purchasing development rights or fee title with county, state or federal grant money, and transferring development rights to certain “receiving areas” with increased density. However, until such time as more public money becomes available to help with such purchases, and until the Transfer of Development Rights mechanism becomes more operational at the municipal level, most parcels of land in any given community will probably be developed eventually. In that situation, coupling the conservation subdivision design approach

with multi-optioned conservation zoning offers communities the most practical, doable way of protecting large acreages of land in a methodical and coordinated manner.

### **Conclusion**

Because of its low costs and inherent adaptability, the basic “building block” for creating Open Space Networks, as envisioned in a community’s *Comprehensive Plan* and enabled in its zoning ordinance, is the “conservation subdivision”. When local officials and residents are sensitized to the kind of “wall-to-wall” development that their existing conventional land-use codes will ultimately produce, they often become much more amenable to revising those codes to *require* that basic conservation principles be followed in the design of new subdivisions, and that the open space thus protected be laid out so as to create an interconnected network of conservation lands. All this can be achieved without involving any “taking” because the undivided conservation land typically remains under private ownership (usually by a homeowner association or a local land trust). When the municipality desires all or part of the land for public park purposes, and the developer is agreeable, conservation land may be donated or sold at a negotiated price to the community. (Another alternative is for municipalities to offer density bonuses in exchange for public dedication of the conservation acreage, or for greenway trail easements through it).



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## **Brief Biography of Author**

Randall Arendt, MRTPI, is Vice President of Conservation Planning at the Natural Lands Trust in Media, Pennsylvania. He is the author of *Conservation Design for Subdivisions: A Practical Guide for Creating Open Space Networks*, and is the principal author of *Rural by Design: Maintaining Small Town Character*, which has been selected by the American Planning Association as one of 39 volumes in its recommended “essential planning library”. Mr. Arendt has lectured in 43 states and has designed conservation subdivisions in ten states.

## **Appendix: The *Growing Greener* Program in Pennsylvania**

### **Appendix A.1**

#### ***Growing Greener*: A Thumbnail Summary**

Communities across Pennsylvania are realizing that they can conserve their special open spaces and natural resources *at the same time* they achieve their development objectives. The tools? Conservation zoning and conservation subdivision design, an approach we're calling *Growing Greener*.

**What Is *Growing Greener*?** *Growing Greener* is a new statewide community planning initiative, a collaborative effort of the Pennsylvania Department of Conservation and Natural Resources (DCNR), Natural Lands Trust, and the Pennsylvania State University Cooperative Extension. *Growing Greener* is designed to help communities use the development regulation process to their advantage to protect interconnected networks of permanent open space. The program offers multi-media educational material and technical assistance to communities so that conservation and development objectives may be achieved simultaneously, in a manner that is fair to all parties concerned.

As an example of the magnitude of success that can be achieved in this way, one Pennsylvania community has conserved more than 500 acres of prime farmland through this technique alone. This equates to \$3.5 million dollars worth of land conservation at no cost to the township, no dependence on public bond funds, no sacrifice to local landowners, and no "takings" from developers.

***The Conservation Design Concept.*** Each time a property is developed into a residential subdivision, an opportunity exists for adding land to a community-wide network of open space. Although such opportunities are seldom taken in many municipalities, this situation could be reversed fairly easily by making several small but significant changes to three basic local land-use documents -- the comprehensive plan, the zoning ordinance, and the subdivision and land development ordinance. Simply stated, Conservation Design rearranges the development on each parcel as it is being planned so that half (or more) of the buildable land is set aside as open space. Without controversial "down zoning" the same number of homes can be built in a less land-consumptive manner, allowing the balance of the property to be permanently protected and added to an interconnected network of community green spaces. This "density-neutral" approach provides a fair and equitable way to balance conservation and development objectives.

#### **1997 Program Highlights**

- Completed an array of user-friendly educational material including a scripted slide show, 18-page summary booklet, 250-page workbook and conservation poster board set. Distributed over 5,000 copies of the booklet and 125 copies of the workbook throughout Pennsylvania.
- Tested the educational material at four pilot workshops in central Pennsylvania. Ninety-nine percent of the participants rated the workshops as good or excellent and sixty-four percent stated that they see their community adopting *Growing Greener* standards in their local land use regulations.

- Assisted five communities that are in the process of adopting *Growing Greener* standards in their land use regulations.

### **1998 Program Highlights**

- Ten regional workshops across the state have been scheduled to introduce planners and local officials to the *Growing Greener* concept.
- Natural Lands Trust is working with partners (county planning agencies and private consultants) to build their capacity to use the *Growing Greener* material to further conservation objectives in their communities.
- The Trust will provide direct technical assistance to a dozen communities that wish to adopt *Growing Greener* standards.
- An instruction manual for a “Train-the-Trainer” course to be offered on a continuing basis to local officials throughout Pennsylvania is being developed by Prof. Stanford Lembeck of Pennsylvania State University for use in the *Growing Greener* program. This effort will be accompanied by a parallel effort in which county planning staff and private-sector planning consultants will be offered special instruction to become certified trainers of local officials.

## Appendix A.2

### Two Examples of Conservation Subdivisions

The two examples shown here demonstrate how conservation design principles can be used to protect different kinds of resources. In *Garnet Oaks*, a woodland wildlife preserve was set aside by the developer, who also constructed extensive walking trails. A well-equipped tot lot and an informal picnic grove provide additional amenities to the residents. At *Farmview*, 137 acres of productive farmland were permanently protected, in addition to most of the woodlands. This subdivision prompted the Township to revise its conventional zoning so that the developer's creative design could be approved. Since that time over 500 acres of prime farmland have been preserved in this community through conservation subdivision design representing a \$3.5 million conservation achievement (at an average land value of \$7,000) and these figures continue to grow as further subdivisions are designed. The potential for replicating this and achieving similar results in other communities in metropolitan regions across the country is enormous.

#### Example One: Working Farmland Zoned for One-Acre Houselots

Subdivision Name: *Farmview*

Location: Woodside Road and Dolington Road, Lower Makefield Township, Bucks County, Pennsylvania

Developer: Realen Homes, Ambler

Development Period: 1990–96

Located on a 418-acre site, **Farmview** is a 322-lot “density-neutral” subdivision whose layout was designed to conserve 213 acres of land (51 percent of the property), including 145 acres of cropland and 68 acres of mature woods. While 59 percent of the original farmland was needed for development, 41 percent categorized as prime agricultural and farmland of statewide importance was able to be preserved in addition to nearly all of the wooded areas.

The 145 acres of farmland that have been saved were donated by the developer to the Lower Makefield Farmland Preservation Corporation, a local conservation organization whose members include local farmers, township residents and an elected official liaison. This cropland is leased to farmers in the community through multi-year agreements that encourage adaption of traditional farming practices to minimize impacts on the residents, whose yards are separated from their operations by a 75-foot deep hedgerow area thickly planted with native specie trees and shrubs.

Realen Homes also donated the 68 acres of woodland to the township to support local conservation efforts in creating an extended network of forest habitat and wildlife travel corridors. These areas also offer potential for an informal neighborhood trail system in future years. (The developer's offer to construct such trails was declined by the supervisors, citing liability concerns, despite the fact that other townships in the region actively encourage such trails in new subdivisions and also on township conservation lands.)

Had it not been for the developer's initiative and continued interest, this subdivision would have been developed into the same number of standard-sized one-acre lots, which was the only option permitted under the township's zoning ordinance in 1986 when Realen purchased the property. After 18 months of discussing the pros and cons of allowing smaller lots in exchange for serious land

conservation benefits, the supervisors adopted new zoning provisions permitting such layouts specifically to preserve farmland when at least 51 percent of a property would be conserved. These regulations target the most productive soils as those which should be “designed around.”

Although other developers were at first skeptical of Realen’s proposal to build large homes (2,600–3,700 sq. ft.) on lots which were typically less than a half an acre in a marketplace consisting primarily of one acre zoning, the high absorption rate helped convince them that this approach was sound. Contributing to the project’s benefits to both the developer and the township were reduced infrastructure costs for streets, water, and sewer lines. Premiums added to “view lots” abutting the protected fields or woods also contributed to the project’s profitability.

### **Example Two: A Thickly-Wooded Site with Half-Acre Zoning**

Subdivision Name: *Garnet Oaks*

Location: Foulk Road, Bethel Township, Delaware County, Pennsylvania

Developer: Realen Homes, Ambler

Development Period: 1993–94

Just over half of this 58-acre site has been conserved as permanent privately-owned open space through the simple expedient of reducing lot sizes to the 10,000–12,000 sq. ft. range (approximately 1/4 acre). The developer reports that these lot sizes did not hinder sales because about two-thirds of the lots directly abut the densely wooded open space, which gives them the feel and privacy of larger lots. In fact, the evidence indicates that the open space definitely enhanced sales in two ways: increased absorption rates and higher prices (through premiums added to the prices of lots which abut the conservation areas).

The locations of these conservation areas were carefully selected after a comprehensive analysis of the site’s natural and historic features had been conducted. Those secondary features that were identified for preservation included a line of mature sycamore trees along an existing farm lane, a stone wall and springhouse, and several areas of healthy deciduous upland woods, in addition to the site’s delineated wetlands. Based on information received from post-sales interviews in its previous developments, Realen’s staff learned that today’s homebuyers are considerably more discerning than they were 10 and 20 years ago, and now look for extra amenities not only in the houses but also in the neighborhood setting. This knowledge led Realen to take special measures to protect trees on individual houselots and within the street right-of-way. Their approach included collaborating with the Morris Arboretum in preparing a training manual for subcontractors and conducting training sessions in tree conservation practices, attendance at which was required of all subcontractors.

The centerpiece of Garnet Oaks’ open space is the near mile-long woodland trail which winds its way through the 24-acre conservation area, connecting a well-equipped playground and a quiet picnic grove to the street system in three locations. Where the trail traverses areas of wet soils it is elevated on a low wooden boardwalk. This trail, which was cleared with assistance from a local Boy Scout Troop, features numerous small signs identifying the common and botanical names of the various plants and trees along the trail. Realen’s staff also designed and produced an attractive eight-page trail brochure that illustrates and describes the flora, fauna, environmental areas, and historic features along the trail. The guide also explains the developer’s creative use of low-lying woods as a temporary detention area for stormwater runoff, a naturalistic design that helped avoid a more

conventional approach in which many trees within the preserve would have been removed to provide for a conventionally engineered basin. Realen's sales staff reported that prospective buyers who picked up a copy of the trail brochure and ventured out onto the trail typically decided to make their home purchase in Garnet Oaks.

### **Appendix A. 3**

#### **Materials and Services Provided Under the *Growing Greener* Program**

During 1998, Natural Lands Trust is making educational material and technical assistance available as described below. In return, participating communities will become *Growing Greener* partners.

#### **Educational Material & Technical Assistance Available to *Growing Greener* Partners**

##### ***1. Educational Material***

Due to the availability of grant subsidies, the products below are offered at reduced costs to *Growing Greener* partners.

***Growing Greener* summary booklet.** An 18-page summary booklet provides an overview of the four key *Growing Greener* conservation tools. It also answers frequently asked questions about conservation subdivision design and illustrates several development case studies. The workbook is designed for easy distribution to elected officials, advisory board members and citizens interested in learning how to create interconnected networks of community greenspaces. Cost: copies are available at no charge to municipalities in Pennsylvania.

***Growing Greener* workbook.** The *Growing Greener* workbook, describes (in laymen's language) the techniques for translating local conservation objectives into operable growth management systems, do-able at the community level. The workbook, developed in consultation with a land use attorney to ensure that the tools are lawful and constitutional, features explanatory text on envisioning the future by conducting community audits; protecting open space through conservation planning; conservation zoning: a "Menu of Choices"; and the unique "four-step design process", an integral subdivision code component. The workbook also contains extensive model language for comprehensive plans, zoning ordinances and subdivision ordinances, plus nine case studies of Pennsylvania conservation developments, in addition to instructions for two hands-on design/learning exercises. These hands-on exercises cover 1) Designing a *Community-wide Map of Potential Conservation Lands* and 2) Designing a conservation subdivision as a building block to the community open space network. Partners, workshop sponsors, and each Pennsylvania community represented at the regional workshop receives one copy of the workbook at no charge.

**Conservation Subdivision Design Poster Board Photos.** A set of 80 color photo enlargements (8 1/2" x 11") in clear self-adhesive vinyl mounting sleeves illustrate actual conservation subdivisions in Pennsylvania. We suggest that these photos be mounted on foam-core boards for easy display (eight fit nicely on 2' x 3' boards). Graphics for two of the ten poster boards illustrate conservation zoning and subdivision "basics" (the four-step process and the five density options). The poster board idea was developed in response to pilot workshop requests to take a closer look at some of the key images seen during the slide presentation. The boards are easily transported to public meetings

and have proven invaluable to Natural Lands Trust staff in answering the question “What does a conservation development really look like?” Cost: \$300 within Pennsylvania for the complete set of 80 color photocopies in vinyl sleeves with mounting instructions for ten foam core boards. (Note: Smaller sub-sets of individual conservation subdivisions can be ordered if fewer examples are needed.)

***Growing Greener Scripted Slide Presentation.*** Partners may purchase a “library” of over 250 slides and a suggested script to help them present the conservation planning concepts in the communities where they work. The slides and script can be modified to give the “basic Pennsylvania” version a more local flavor. The presentation is designed to be used either in its entirety or, more likely, trimmed and modified into “mini-series” slide presentations, focussing on selected aspects of conservation design such as conservation subdivisions, village/hamlet developments, the four-step design process, zoning density options for conservation subdivisions, etc. Cost: \$500, which includes 264 slides numbered in two carousels, a script and suggestions for presenting the slides, plus a diskette containing the basic script. (Note: Smaller subsets of the slide library may also be purchased.) Not available outside Pennsylvania.

***Growing Greener video.*** A video version of the slide presentation will be available during the second half of 1998. The video will be especially useful to loan to communities which do not have professional staff available to conduct the scripted slide presentation (and to answer related questions), and for local officials, consultants, developers or conservation organizations that wish to “preview” the concept before introducing it to a larger audience. It could also be helpful for officials or residents who were not able to attend the slide presentation given in their area. Cost: \$15.00, within Pennsylvania.

## **2. Subsidized Technical Assistance to *Growing Greener* Partners**

*Regional Workshops.* *Growing Greener* workshops are being conducted in many regions around the Commonwealth, at no cost to our hosts in the sponsoring regions. The workshops include a slide presentation and hands-on exercises demonstrating conservation zoning and conservation subdivision design techniques. The Trust encourages county planning agencies to team up with local land conservancies, planning consultants, historical societies, conservation districts, local engineers, surveyors, landscape architects, realtors, developers, etc. to sponsor the workshop. The Trust is relying upon its partners to help with logistical aspects such as mailings and collecting registration forms and fees, providing the workshop meeting space, and arranging for meals and/or refreshments.

**Regional Technical Consultations for Planning Staff.** The Trust is available to meet with planning staff and other planning and design professionals on a regional basis to provide “nuts-and-bolts” technical assistance on how to create the planning components and ordinances discussed in the *Growing Greener* workbook. There will be no charge for this service.

**Support from NLT staff.** As partner communities begin to use the support material, they may call upon NLT staff to answer their questions, again at no charge. Trust staff is available as a resource to help them deal with any technical problems that may arise.



**“Train-the-Trainer” course.** Dr. Stanford Lembeck of Pennsylvania State University is working with the Trust to develop an instruction manual and curriculum for an intermediate-level “Train-the-Trainer” course to be offered at several locations across the state during 1999.

### ***3. Direct Technical Assistance to Pennsylvania Communities***

During 1998 and 1999 the Trust is making available, on a first-come, first-served basis, a limited amount of direct technical assistance to communities that wish to adopt *Growing Greener* conservation ordinance standards. These services are being partially subsidized, as follows:

***Audits of plans and regulatory codes.*** The audit analyzes past and current development trends and projects them into the future so that officials and residents may see the long-term results of continuing with current ordinance provisions. Trust staff reviews a community’s plans and regulatory codes to assess how its conservation objectives are being met. A written report and public presentation are prepared for the client. Cost: Audits generally cost \$1,000 to \$1,500 with a maximum *Growing Greener* subsidy of \$800 per community.

***Subdivision and Zoning Code Revisions.*** The Trust assists those communities interested in adapting the model ordinance language in the *Growing Greener* workbook to their subdivision and zoning codes. The costs of ordinance updates vary, usually in the range of \$7,500 to \$9,000, with a maximum *Growing Greener* subsidy of \$6,000 per community.

***Conservation Subdivision Design Services.*** The Trust prepares subdivision sketch plans conforming to *Growing Greener* standards. Design services are available to communities and/or willing developers who wish to explore how conservation subdivisions can both meet conservation objectives and offer the landowner full return on their investment. The Trust also offers consultations on how plans can be revised to better reflect *Growing Greener* design principles. The client receives an analysis of the site’s natural and cultural features, a “conventional” layout (where none exists), and a conservation design (following the “four-step” design process). Cost: approximately \$2,000 with a maximum subsidy of \$1,350 per property.

### **Responsibilities as a *Growing Greener* Partner**

County planning staff and private-sector planning consultants in Pennsylvania are being invited to become *Growing Greener* “partners”. Accepting a partnership position entails certain basic responsibilities, described briefly below.

- *First and foremost, to use the material to further the conservation objectives in the communities where you work.* Partners are encouraged to devote a portion of their staff time to using the material in the communities where they work and, to the greatest extent possible, to promote implementation of *Growing Greener* techniques in those communities.
- *To help the Trust measure success.* NLT needs to measure the program’s effectiveness in conserving land. Each of the educational products is accompanied by a short monitoring form which we ask partners to complete and return to us. Also, any other information regarding the program’s accomplishments, suggestions on how to improve the materials, etc., is always appreciated. Partners

will be asked to report very briefly, on an annual basis, when they use the material, the number of people in attendance at workshops, survey results for workshops, and any plans and ordinances adopted or in progress as a result of the *Growing Greener* material, or subdivisions approved which follow *Growing Greener* principles.

- *Annual “summit.”* Partners are encouraged, but not required, to attend an annual *Growing Greener* summit where success stories, implementation difficulties, and suggestions can be shared.

- *Partners are encouraged, but not required, to become Growing Greener “Train-the-Trainer” instructors.* Partners are also encouraged to enroll their staff, elected officials and advisory board members in the course. The Train-the-Trainer program is scheduled to begin in late 1998.

- *Partnerships have no specific length commitments.* We envision that the initial three year program will continue for many years. We also anticipate that the partial subsidies for products and services provided by the DCNR, the William Penn Foundation and the Alexander Stewart, M.D. Foundation, will continue for the next two years. Any *Growing Greener* item may be returned within 30 days for a full refund of the purchase price if it fails to meet expectations.

## Captions

### **Fig. 1**

The pattern of “wall-to-wall subdivisions” that evolves over time with zoning and subdivision ordinances which require developers to provide nothing more than houselots and streets.

### **Fig. 2**

A matching pair of graphics, taken from an actual “build-out map,” showing existing conditions (mostly undeveloped land) contrasted with the potential development pattern of “checkerboard suburbia” created through conventional zoning and subdivision regulations.

### **Fig. 3**

Part of a *Map of Potential Conservation Lands* for West Manchester Township, York County, PA. West Manchester’s map gives clear guidance to landowners and developers as to where new development is encouraged on their properties. Township officials engaged a consultant to draw, on the official tax parcel maps, boundaries of the new conservation lands network as it crossed various properties, showing how areas required to be preserved in each new development could be located so they would ultimately connect with each other. In this formerly agricultural municipality the hedgerows, woodland remnants, and the riparian buffer along the creek were identified as core elements of the conservation network.

### **Fig. 4**

The conservation lands (shown in gray) were deliberately laid out to form part of an interconnected network of open space in these three adjoining subdivisions.

**Fig. 5**

This sketch shows how you one apply the techniques described in this paper to set aside open space which preserves rural character, expands community parkland and creates privacy for residences. (Source: Montgomery County Planning Commission, Norristown, Pennsylvania).

**Fig. 6** STEP ONE, Part One  
*Identifying Primary Conservation Areas*

**Fig. 7** STEP ONE, Part Two  
*Identifying Secondary Conservation Areas*  
Typically unprotected under local codes, these special features constitute a significant asset to the property value and neighborhood character. Secondary conservation areas are the most vulnerable to change, but can easily be retained by following this simple four-step process.

**Fig. 8** STEP ONE, Part Three  
*Identifying Potential Development Areas*  
for Options 1, 2, and 5

**Fig. 9** STEP TWO  
*Locating House Sites*

**Fig. 10** STEP THREE  
o *Aligning Streets and Trails*

**Fig. 11** STEP FOUR  
*Drawing in the Lot Lines*

**Fig. 12** Aerial Perspective of Conventional Layout

**FIG. 13** Aerial Perspective of Conservation Design

**Fig. 14 YIELD PLAN**

The kind of subdivision most frequently created is the type which blankets the development parcel with houselots, and which pays little if any attention to designing around the special features of the property. In this example, the house placement avoids the primary conservation areas, but disregards the secondary conservation features. However, such a sketch can provide a useful estimate of a site's capacity to accommodate new houses at the base density allowed under zoning -- and is therefore known as a "Yield Plan."

**Fig. 15** OPTION 1  
*Density-Neutral with Pre-existing Zoning*

18 lots  
Lot Size Range: 20,000 to 40,000 sq. ft.  
50% undivided open space

**Fig. 16** OPTION 2  
*Enhanced Conservation and Density*  
24 Lots  
Lot Size Range: 12,000 to 24,000 sq. ft.  
60% undivided open space

**Fig. 17** OPTION 3  
*Estate Lots*  
50% Density Reduction  
9 Lots  
Typical Lot Size: 160,000 sq. ft. (4 acres)

**Fig. 18** OPTION 4  
*Country Properties*  
5 Lots  
Maximum Density: 10 acres per principal dwelling  
70% density reduction

**Fig. 19** OPTION 5  
*Hamlet or Village*  
36 Lots  
Lot Size Range: 6,000 to 12,000 sq. ft.  
70% undivided open space

**Fig. 20**  
An Option 5 village surrounded by its own open space and buffered from existing public road by two “country properties” (Option 4).

**Fig. 21** About half the homes on the larger lots in the conventional layout (left) will be served by marginal soils that barely manage to pass the minimum requirements for septic drain fields, and are much more likely to experience system failure than those located on the smaller lots in the conservation design, where all the drain fields can be installed on the best soils available on the entire property.

**Fig. 22**  
A practical alternative to central water or sewage disposal facilities are individually-owned wells and/or septic systems located within conservation areas, in places specifically designated for them on the final plan.

**Fig. 23**

Various private and public entities can own different parts of the open space within conservation subdivisions, as illustrated above.