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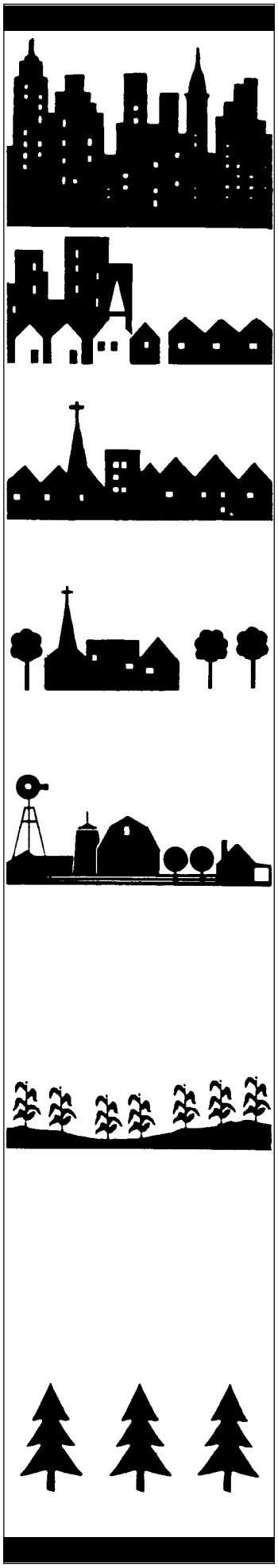

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28. Arendt.
29. Fernandez.
30. Fernandez.
31. Arendt.
32. Arendt.
33. Arendt.

10. For example, Rich Pais at Daft, McCune, and Walker; Robert Kaufman at The Michael T. Rose Companies. The writers of model ordinances recommend this approach. For example, the authors of *The Subdivision and Site Plan Handbook* say that they consulted "planners, engineers, attorneys, and developers" in their work.

11. Prince George's County *Landscape Manual*, October 1989.

12. *Landscape Manual*.

13. Town of Easton Zoning Ordinance, Title V, January 1993.

14. Prince George's County Zoning Ordinance, Part 8, Sec. 27-477.

15. Achieving the Visions Award citation.

16. Prince George's County Achieving the Visions Award application.

17. Prince George's County Achieving the Visions Award application.

18. Prince George's County Achieving the Visions Award application.

19. Mt. Ranier Town Center Development Plan.

20. Prince George's County Achieving the Visions Award application.

21. Lane H. Kendig. "Developers and Performance Zoning." *Urban Land*, January 1982.

22. Lane Kendig. *Performance Zoning*. Washington D.C.: Planners Press, American Planners Association, 1980.

23. Kendig, *Performance Zoning*.

24. Joseph J. McElroy. "You Don't Have To Be Big To Like Performance Zoning." *Planning*, May 1985.

25. John M. Fernandez, AICP. "Boulder Brings Back the Neighborhood Street." *Planning*, June 1994.

26. Arendt.

27. Kendig, *Performance Zoning*.

Part II

1. Greenwood, Douglas. "Building Green." *Blueprints*, XII:1, Winter 1994.

2. J. William Thompson. "Of Gold, Groundwater, and the Great Blue Heron." *Landscape Architecture*, September 1993.

3. Steven Stepanek. "Reaching (Eco)Logical Conclusions." *Buildings*, May 1992.

4. Jim Hill, engineer and plan reviewer with Readington Township.

5. Hill.

6. Michael T. Rose Companies. *Built From Nature's Blueprints*, design proposal for Northridge, 1988.

7. Michael T. Rose Companies.

Part III

1. Randall Arendt. *Rural by Design*. Chicago: American Planning Association, 1994.

2. Michael T. Rose Companies.

3. *Environmental Guidelines*. The Maryland-National Capital Park & Planning Commission, Montgomery County Planning Department. January 1993, Corrected June 1994.

4. Nancy Peterson. "New Development with an Old Vision." *Environmental Currents: The Newsletter of the Brandywine Conservancy's Environmental Management Center*, 16:1, Winter 1991-1992. (Reprint of *Philadelphia Inquirer* article of April 4, 1991.)

5. Peterson.

6. *West Vincent Township Zoning Ordinance and Subdivision/Land Development Ordinance Amendment, Ordinance No. 64 of 1991*.

7. West Vincent Township Ordinance.

8. West Vincent Township Ordinance.

9. West Vincent Township Ordinance.

END NOTES

Part I

1. Quote by Gary Moll, vice-president of urban forestry for the American Forest Association. H. Jane Lehman, "Some Developers Making New Efforts to Save Trees," *The Washington Post*, March 31, 1990.

2. Carnahan, Gary. "Low Impact Development in Planned Communities." *Developments*, March 1994.

3. Devereaux, William and Susan Bradford. "Natural Causes." *Builder*, July 1991.

4. *Land Development*, Spring/Summer 1993.

5. Lehman.

6. Devereaux and Bradford.

7. Lehman.

8. Carnahan.

9. Lehman.

10. Carnahan.

11. Carnahan.

12. From literature provided by Andropogon Associates, Ltd.

13. Carnahan.

14. Devereaux and Bradford.

15. According to Rich Pais of Daft, McCune and Walker in Towson, MD.

16. "Portfolio: Greymarsh Crossing, Wilmington, North Carolina." *Land Development*, Fall 1993.

17. Devereaux and Bradford.

comprehensive design guidelines which will specify exactly when, where, and how on-site clearing operations are to be managed. The guidelines will specify that no clearing or ground disturbance shall occur within those areas identified as outside the limits of disturbance, and will set forth requirements for protection of lands, trees, and other vegetation to remain undisturbed.

The guidelines will further specify those periods of the year during which any clearing or other noise-generating activity is prohibited within the limits of disturbance. These provisions will assure that the nesting and breeding seasons of birds and other wildlife are not interrupted.

The construction schedule will be structured to minimize overall disturbance. Rapid sequencing of essential clearing, installation of storm water management facilities, construction, soil stabilization and reforestation will be utilized.

Existing vegetation will be supplemented with extensive natural landscaping, utilizing plant materials that occur naturally on the site and that provide food and shelter for wildlife. In particular, those areas which are now in open fields will be replanted for compatibility with the natural areas of the property. The developer and its consultants will work with the County during the Final Plan process to develop additional construction and landscape details which will enhance the aesthetic and environmental values of the community.

spilling his coffee, but a radius of 140 feet can slow traffic to 25 miles-per-hour--fine for a residential neighborhood. Even a radius of 90 feet will allow a car to move at 20 mph. Reverse curves should be allowed as well, "in which road curves change their direction...without an intervening straight segment."[31]

Cul-de-sacs

Since curbs intensify runoff and the pollutants it carries, an ordinance should limit their use in subdivisions to those containing four or more units per acre, or along steep roads (above eight-percent grade). The Department of Environmental Protection in Connecticut discourages the use of curbs and underdrains in new subdivisions because without them polluted runoff seeps into the ground more evenly and is diffused better. With less concentrated runoff, less need exists for retention basins, which are often "a second engineering solution...required to mitigate the problems caused by the first one (i.e., the curbing)."[32] It should be noted that open section roads break up at the edges more frequently than curb and gutter sections, and therefore may have higher maintenance costs.

Cul-de-sacs are a popular way to cut down speeding traffic caused by overly wide streets. But shorter streets with "T" intersections can hold down speeds also, as can all-way stop signs at intersections.

With a flexible ordinance, the impervious acreage dedicated to cul-de-sacs can be reduced in other ways. A radius as small as 30 feet is practical (firetrucks would need to make a three-point turn). A street of ten or twelve houses can replace a cul-de-sac altogether with a 50-foot "hammerhead." For larger developments, the standard round asphalt parade ground baking in the sun can be replaced by a loop road that has inside it "a quarter-acre island of undisturbed vegetation."[33]

Example: Covenants that take the Place of Government Regulation

The system of covenants accompanying the Riverside South 40 Residential project in Harford County can serve as regulatory streamlining:

> Limits of disturbance will be clearly identified and enforced with restrictive covenants. The developer will work closely with County officials during the Final Plan process to assure that the limits of disturbance are as tight as possible.
>
> The restrictive covenants will be implemented through

Variable road width standards for residential streets. (Reprinted with permission from *Performance Zoning*, © 1980 by the American Planning Association, 1313 E. 60th Street, Chicago, Il 60637.)

Curve Radii

out a lot of trees. A look at roads in older towns shows that they often could "accommodate 18-foot pavements, nominal shoulders, drainage swales, and utility poles without being clear-cut across the entire right-of-way."[28]

What about liability for narrow streets? A member of the Institute for Transportation Engineers' technical committee on neotraditional design said, "'legal obstacles to narrow streets are a red herring.'"[29] A 1993 study for the National Conference on Tort Liability and Risk Management for Surface Transportation "concluded that tort cases 'invariably have to do with high speed,' not street width."[30]

Curbs

Most zoning ordinances could help the environment and promote more interesting subdivisions by permitting tighter curves on local streets. Minimum centerline curve radii are often 350-450 feet, making curves gentle enough for an Indy driver to take them at full throttle without

The model ordinance included in *Performance Zoning* contains a heavy industry district and a transitional holding district. Although the model ordinance appears daunting, the concepts allow for great flexibility of implementation, and even small towns such as Bath, Michigan have enacted their own versions of performance zoning.[24]

The wide streets of most subdivisions neglect such uses as walking, playing, and visual delight. "The wide lanes required by today's codes lead to higher speeds, more accidents, and greater urban fragmentation."[25] Most road standards being applied in rural subdivisions were designed decades ago for "huge tract housing developments built in many metropolitan and suburbanizing areas":

> The result has been the construction of streets that are typically 50 percent wider than the existing rural collector roads that serve them. Other problems have involved inflexible and inappropriate standards for curve designs, gradients, storm-water management, and pedestrian circulation. In fact, the typical subdivision road required by many municipalities today is overdesigned, needlessly expensive to build and maintain, dangerous to neighborhood residents, problematic for storm-water management, and decidedly nonrural in appearance."[26]

Performance zoning adds flexibility to road design by making width and curvature dependent on function.

At densities of four or more units per acre, where driveways and two-car garages are hard to fit, streets wide enough for a continuous line of parked cars make sense. At lower densities, on-street parking declines and an 18-20 foot roadway can replace one 24-30 feet. A moving car will have to slow down when passing a parked car, but this is a good idea for cutting down on speeders.

The five road widths in Kendig's hierarchy are based on four factors:

1. Traffic volume
2. Design speed
3. Parking
4. Lot width. "Lot width affects the need for on-street parking: lots which are wide and large require less on-street parking."[27]

Clear-cutting an entire right-of-way is usually unnecessary and wipes

entire parcel.

2. Impervious surface ratio.

3. The density of dwelling units (for residential development). The gross density is the number of dwelling units divided by the acreage of the entire site. The more useful "density factor" is the number of dwelling units per acre of net buildable land.

A fourth variable, floor area ratio (floor area of a building divided by the area of the site) is used for non-residential development.

> With most resources, the developer will seek to encroach to the maximum extent possible in order to achieve maximum intensity. The performance approach takes a larger than lot-by-lot perspective in regulating environmental degradation. It strives to permit maximum development and at the same time to protect resources by requiring a site capacity rather than a lot capacity analysis of developmental constraints. Unlike the conventional approach, performance zoning takes into account the fact that natural resources are often present only in scattered, small areas that can only be dealt with in conventional zoning by resorting to spot zoning.[23]

The zoning districts formed under this system are fewer but more broadly drawn. The differences among them are clearer than those of the conventional zoning ordinance. For example:

District	Max. Gross Density	Density Factor	Open Space Ratio	Impervious Surf. Ratio
Wilderness	.07	3.50	.98	.01
Agricultural	.22	2.20	.90	.05
Conservation	1.00	6.60	.85	.06
Rural	.70	3.50	.80	.08
Estate	.48	.96	.50	.08
Development *	2.00	4.00	.50	.18
Urban Core	10.50	14.00	.25	

* Most of the growth will occur in these medium-density development districts. They will receive most of the capital improvements, and allow commercial, institutional, and some industrial uses.

Road Width

> landowner a number of ways to develop his property. Instead of attempting to restrict the use of the land to protect the environment or neighbors, carrying capacity standards protect the environment and buffering standards protect neighbors. The standards are based on performance, not land use.[21]

One benefit of performance zoning is a decrease in requests for variances; another is an end to the vague language of conditional uses, which leads to "arbitrary decisions, inconsistency, and uncertainty." Development that meets the standards is approved. Perhaps our instincts tell us to combat sprawl by creating more zones rather than fewer, but, according to *Performance Zoning*, more zones are not the answer:

> As the number of districts grows, it becomes harder to distinguish among them...[T]he purpose of any given district becomes blurred, and the formal distinctions themselves become less defensible. An increase in the number of districts results in fewer uses being permitted in any single district. This decreases the likelihood that an available site will be properly zoned to match a developer's needs.

Conventional zoning, which assumes that the landscape is flat, does not treat sensitive areas well:

> A natural resource which cannot be developed always has the effect of reducing the buildable area. Further, the location of the resources on a site may create an irregular shape with unusable corners or render access to portions of a site difficult.... Because the presence of resources tends to reduce density and increase street length per dwelling unit, there are intense economic pressures working against environmental protection.[22]

In performance zoning, developers are not forced to spread uniform lots over a whole site in order to make a profit; instead, they are allowed to build the same number of units but on fewer acres. Houses cost less, all types of housing are permitted, and natural features are spared, because development is regulated not by zone but by three variables:

1. Open space ratio. This is the percentage of a site that is not included in privately owned lots but remains open and undeveloped. Developers can still have the same number of lots as before, but they would be smaller and not spread out across the

The M-U-TC zone is designed to make parts of U.S. Route 1 the local town centers they once were. The standards for setbacks, green space, and parking, "which serve as an obstacle to most development in older developed areas such as those in the Route 1 corridor[,]" have been replaced.[19] The Master Plan for the areas "recognizes the inappropriateness of existing regulations and the effect this has on revitalization efforts. It then recommends that design standards be created to protect and conserve buildings and development patterns which make these centers distinctive."[20]

The Special Permit Process works in the M-U-TC zone also.

Example: Performance Zoning

Prince George's County also has in place a "green letter" priority system to streamline commercial, industrial, and mixed use development within the Beltway. If a permit application is problematical, the Revitalization Division Coordinator can, in a moment's notice, gather together key members from permitting agencies who have the authority to make immediate decisions on the project. This team can make judgements above the level of plan reviewers who can say yes or no to a plan but not "yes, if you do this."

This example shows that the zoning ordinance may provide flexibility of design, but the planning office bears much of the responsibility for streamlining the approval process once those new designs come in the door.

If environmentally sensitive design lets the land shape the plan, then conventional subdivision methods, by running a standard pattern of lots up hill and down dale, are not environmentally sound. Large lot zoning is not a good conservation tool either, because it obliterates natural features and does not leave enough contiguous land in its natural state. Performance zoning, however, can overcome these shortcomings. Rather than starting with prescriptions such as fixed lot sizes, performance zoning begins with the landscape, giving general goals that a developer is free to reach in a variety of ways. The leading work on performance zoning is Lane Kendig's *Performance Zoning* from 1980. The rationale behind the system is this:

> [U]ses are generally permitted as a matter of right in urbanizing areas.... Performance zoning employs districts to separate areas with broadly different functions and character (e.g. rural and urban) rather than relying on the districts to isolate different uses. The idea is to permit the

and make these areas more marketable in a competitive market place."[15] The I-1 zone, for example, with its landscaping, parking, and loading requirements, made redevelopment difficult in older industrial areas. The new zone clears these obstacles away.

> New uses or changes to old uses can be achieved with minimal regulations unless the property abuts residential land or certain primary streets. Furthermore, virtually any development standard in the new zone may be modified by a new approval procedure called the Alternative Development Technique.
>
> The Alternative Development Technique (ADT) allows an applicant to demonstrate that a proposed development satisfies adopted development guidelines not inflexible regulations that are obviously inappropriate for the area. This process could avoid the need for several public hearings and multiple variance or departure applications.... The idea is to create as much regulatory flexibility as possible and to assure that decisions are fair and delivered quickly.[16]

The planning director makes the decisions on ADT applications, which can be appealed to the planning board.

An Optional Parking Plan that relaxes minimum parking standards may be approved by the planning board if two or more businesses propose it and the board determines that "suitable land is unavailable, that on and off-street parking will satisfy parking demand, and that modifications to parking standards are necessary to allow on-street parking and loading alternatives. If used successfully, this process could allow new development and redevelopment to occur without the constant review for parking adequacy."[17]

If these parking options are wise for redevelopment of urban areas, perhaps they can be adapted to serve environmental ends elsewhere.

Finally, the U-L-I zone is accompanied by a new Special Permit process that speeds up development. "This process was developed to bridge the gap between permitted by right uses and special exception uses."[18] Projects that may have impacts on neighbors must be reviewed by the planning board for conformity with ULI development guidelines or guidelines in other master plans. In the past, they might have required a special exception.

for including those benefits.

Below is the review process for the CDZ:

(a) The purposes of each individual Comprehensive Design Zone...are intended to be satisfied by establishing incentives for good development, and the following three (3) phase plan review procedure:

(1) The initial phase is the review of a Basic Plan, which shall show the types, amounts, and general location of land uses proposed. The Basic Plan shall be reviewed concurrently with the review of, and action on, the Zoning Map Amendment application....

(2) The second phase is the review of a comprehensive Design Plan, text, and schedule, which shall show amounts and locations of land use, the circulation system, and the portions of development which may be constructed during the same time period.

(3) The third phase is the review of a Specific Design Plan, which serves as the final design of the development for each portion to be constructed during the same time period.

(b) All plans referred to in (a), above, shall be reviewed and acted upon prior to, or concurrently with, the review of, and action on, a subdivision proposal.

(c) The three (3) phases of review may be filed or considered concurrently.

Example: Flexible Permitting Procedures **(for Streamlining in Redevelopment Areas)**

Prince George's County Neighborhood Conservation and Revitalization Strategy

One way to relieve pressure on sensitive areas is to build in places that are already developed. Prince George's Neighborhood Conservation and Revitalization Strategy seeks to streamline redevelopment inside the Beltway through the creation of two new zones--M-U-TC (Mixed Use Town Center) and U-L-I (Urban Light Industrial)--and a flexible permitting procedure. The Prince George's plan has won a 1994 "Achieving the Visions Award" from the Economic Development, Resource Protection, and Planning Commission.

Prince George's County recognized that its zoning ordinance was intended for suburban development, so the new zones in the urbanized areas "were designed to ease the existing maze of regulatory processes

Example: Ordinances that Contain Incentives

4. ***Step IV: Site Plan Review and Action. Upon Mayor and Town Council approval of a PUD District Zoning Map Amendment, the applicant shall prepare a detailed development plan in accordance with the site plan requirements specified in 806.3 B. of this Ordinance and/or the requirements of the Town of Easton Subdivision Regulations.***

Prince George's County's Comprehensive Design Zones (Part 8, Prince George's County Zoning Ordinance)

Comprehensive Design Zones (CDZs) have use and density restrictions but no design requirements; developers can gain higher densities if their projects provide extra benefits for the public. These benefits include affordable housing, public facilities...and environmental protection. According to the ordinance:

> There is a need to encourage the optional and imaginative utilization of land contemplated by Comprehensive Design Zones in order to:
> (A) Improve the total environment;
> (B) Lessen the public costs associated with land development and use....

In other words, Comprehensive Design Zones promote economic development, protect the environment, and streamline the development process at the same time. Part of Northridge is a CDZ, which allowed the developer the density and environmental features he wanted.

CDZs can be one of nine types, ranging from "Residential Low Development" and "Village Low Density" to "Major Activity Center" and "Employment and Activity Center." CDZs are not intended for areas where the Master Plan recommends less than one dwelling unit per acre. The exception is the Residential Low Development CDZ, which is "an alternative low-density residential development technique."[14] CDZs containing a density equal to or greater than the Residential Suburban Zone are not intended for areas zoned Open Space, Residential-Agricultural, or Residential Estate. The two village zone CDZs are exceptions.

For each CDZ, the Prince George's Zoning Ordinance provides a description of its purpose, a description of its use, and a table listing guidelines, public benefit features that may be included on the site, and the rewards

Easton's Forest Conservation Ordinance.

2. ***Step II: <u>Planning Commission Review and Action</u>. The Planning Commission shall hold a review and make its recommendations to the Mayor and Town Council.***

3. ***Step III: <u>Mayor and Town Council Action</u>. The Mayor and Town Council shall consider the recommendations of the Planning Commission and approve or disapprove the PUD District Zoning Map Amendment application. In rendering its decision, the Town Council shall make the following findings of fact with regard to the application:***

   a. ***The proposed PUD conforms to all applicable standards set out in this Ordinance for such projects;***
   b. ***The proposed PUD conforms to the Town's Comprehensive Plan, including those provisions of the Comprehensive Plan relating to the design and location of commercial, residential or industrial projects of a nature similar to the proposed PUD;***
   c. ***The proposed PUD, in conjunction with existing and reasonably anticipated development in the neighborhood surrounding the site for the proposed PUD, will not interfere with the adequate and orderly provision of public services to the area;***
   d. ***The proposed PUD, in conjunction with existing and reasonably anticipated development in the neighborhood surrounding the site for the proposed PUD, will not cause unacceptable traffic congestion or hazards either in or near the site for the proposed PUD or elsewhere in the Town or Talbot County;***
   e. ***The proposed PUD is planned in such a manner as to*** protect ***features of historical, cultural, or ecological importance;***
   f. ***The proposed PUD is compatible with existing development in the surrounding neighborhood and with development reasonably anticipated to occur in the neighborhood in terms of size, scale, design, and appearance or, if the proposed PUD is not so compatible, the proposed PUD design contains adequate screening, landscaping and similar features to protect the surrounding neighborhood; and***
   g. ***The proposed PUD shall not unreasonably adversely affect the value of property in the neighborhood surrounding the site....***

Example: Clear Application Procedures

the planned unit development in accordance with the requirements of Section 601 [of the Zoning Ordinance].

Town of Easton Planned Unit Development District (Article V, Town of Easton Zoning Ordinance)

The application procedures for a PUD in Easton are as follows. The protection of ecologically important areas is one criteria for approval of a project.

1. ***Step I: <u>Preliminary Consultation</u>. A preliminary consultation shall be held between the Planning Commission and the applicant or developer of the proposed planned unit development. The application for PUD District zoning shall be accompanied by a preliminary development plan prepared in accordance with the requirements as specified herein.***

   The preliminary development plan shall be to scale and contain sufficient information to establish the identity of proposed uses, grades and approximate dimensions, and locations of proposed structures, streets, parking areas, walkways, easements and property lines. It shall include the following information:

   a. ***Proposed development layout.***
   b. ***Proposed reservations for parks, parkways, playgrounds, school sites and other open spaces.***
   c. ***Proposed location of commercial and industrial uses within the PUD areas, including all associated off-street parking.***
   d. ***Types of dwelling and portions of the area proposed therefor.***
   e. ***Proposed location of dwelling and parking areas.***
   f. ***A tabulation of the total number of acres in the proposed project and the percentage thereof designated for each of the proposed dwelling types, neighborhood retail businesses, other nonresidential uses, off-street parking, streets, parks, schools, and other reservations.***
   g. ***A tabulation of overall residential density per gross residential acre.***
   h. ***Preliminary plans and elevations of the several dwelling types.***
   i. ***Forest Stand Delineation as described in the Town of***

5. ***The owners or developers must indicate that they plan to begin construction of the development within one (1) year after final approval. If construction does not begin within one (1) year, the zoning of the site shall revert to its previous classification unless a time extension is requested by the developer and granted by the Planning Commission.***

6. ***The site proposed to be zoned as a PUD shall have an area of at least five (5) acres. Smaller sites may be permitted...when the proposed PUD is compatible with existing development in the area and does not disrupt the orderly expansion of the highway and street system of the Town. Residential PUD's smaller than five (5) acres shall not include any commercial or industrial uses.***

7. ***The overall residential density of a PUD District shall generally not exceed eight (8) residential units per gross residential acre.... Any land mapped as floodway by the Federal Emergency Management Agency and non-residential uses shall be excluded in computing the gross area. The Planning Commission may require a lower density if review of the proposed development indicates that the maximum allowable density is excessive for the surrounding area.***

8. ***Common Open Space shall comprise not less than thirty (30%) percent of the total gross area. Such space shall include land area to be developed as recreational areas or which is designated for the common use of all occupants of the planned unit development but shall not include streets or off-street parking areas. The Planning Commission must be furnished satisfactory evidence that such open space will be continued and that provision is made for its perpetual maintenance.***

9. ***The setback, lot size, lot coverage, height, and yard requirements shall be established for each individual project by the Planning Commission. In establishing these requirements the Planning Commission shall consider such factors as the proposed intensity of the project and the existing character of the neighborhood.***

10. ***Off-street parking shall be provided for each individual use in***

Example: Flexibility Built into Floating Zones

Town of Easton Planned Unit Development District (Article V, Town of Easton Zoning Ordinance)

This PUD floating zone, like others, sets out general goals and standards but allows flexibility in achieving those ends:

> The purpose of the PUD District is to provide for planned development incorporating a variety of uses and density levels at appropriate locations within the Town of Easton. The PUD District provides for a total development concept, adequate open space, required public facilities, and a variety of housing types and/or compatible commercial or industrial uses as a part of a detailed development plan. [13]

Residential uses are allowed in all zones, while PUDs planned for any "R" district may contain commercial uses that serve residents. In "C" zones, all commercial uses, including shopping centers, are allowed, with industrial uses limited to those found in I-1 districts. If a PUD is planned for an industrial zone, all commercial and industrial uses are allowed. Institutional and Recreational/Entertainment uses found on the Town's list are also allowed in all PUDs.

The development standards to which PUDs must adhere are listed below:

1. ***The area proposed for a planned unit development shall be in one (1) ownership, or, if in several ownerships, the proposal shall be filed jointly by all the owners of the property included in the development plan.***

2. ***The site shall be of a size and shape suitable for the development proposed.***

3. ***Public water and sewerage shall be available, although it may be made available in conjunction with the development of the PUD.***

4. ***The site shall be located adjacent to adequate highway facilities capable of serving existing traffic and that expected to be generated by the proposed development. Private roads may be approved by the Planning Commission if they find that such roads will adequately serve the development. Such roads shall be internal to the development.***

2. ***Space limitations, unusually shaped lots, and prevailing practices in the surrounding neighborhood may justify alternative compliance for in-fill sites, and for improvements and redevelopment in older communities.***

3. ***Change of use on an existing site increases the buffer required by Section 4.7 more than it is feasible to provide.***

4. ***Safety considerations make alternative compliance necessary.***

5. ***An alternative compliance proposal is equal or better than normal compliance in its ability to fulfill the Design Criteria....***

b. ***A proposed alternative compliance measure must be equal or better than normal compliance in terms of quality, effectiveness, durability, hardiness, and ability to fulfill the Design Criteria....***

c. ***Alternative compliance shall be limited to the specific project under consideration and shall not establish precedents for acceptance in other cases.***

d. ***A request for alternative compliance shall be submitted to the Director of the Planning Department (or designee) at the time the plan is submitted. In the case of those plans for which no public hearing is required, the decision of the Director of the Planning Department (or designee) will be final, unless the applicant appeals the decision to the Planning Board. In the case of those plans for which a Planning Board or other public hearing is required: (1) the request for alternative compliance will be accepted no less than 21 calendar days prior to the scheduled date of the hearing; and (2) the Director of the Planning Department (or designee) will forward a recommendation to the proper hearing authority a minimum of 5 working days prior to the hearing.***

e. ***Requests for alternative compliance shall be accompanied by sufficient explanation and justification, written and/or graphic, to allow appropriate evaluation and decision.***

f. ***In a situation where compliance with this Manual is not possible, and there is no feasible proposal for alternative compliance which is, in the judgment of the Director of the Planning Department (or designee), equal or better than normal compliance, then the applicant must apply for an appropriate Departure from Design Standards in accordance with...the Zoning Ordinance.***

Example: Clear Definitions of Regulations, Compiled into a Manual

Prince George's County Landscape Manual

In October 1989, Prince George's County put all its regulations for landscaping, buffering, and screening into one lucid and illustrated *Landscape Manual*. On the first page the county acknowledges that some developers can achieve fine aesthetic and environmental effects on their own:

> The Manual establishes minimum mandatory standards, provides options which will allow greater freedom of design, and establishes a procedure for approval of alternative methods of compliance with the Manual's standards.[11]

An interdisciplinary approach lies behind these standards, which were devised "by the Development Quality Steering Committee at the request of the District Council.... The Steering Committee included representatives from the business community, attorneys, planning, engineering, and design professionals, builders, developers as well as citizen representatives of civic associations."[12] Communication between professionals and vested laymen increases the odds that the solutions are integrated and marketable. In addition, the framers of the Manual have not lost sight of the goal--a better looking Prince George's County. To that end they encourage solutions that differ from their own.

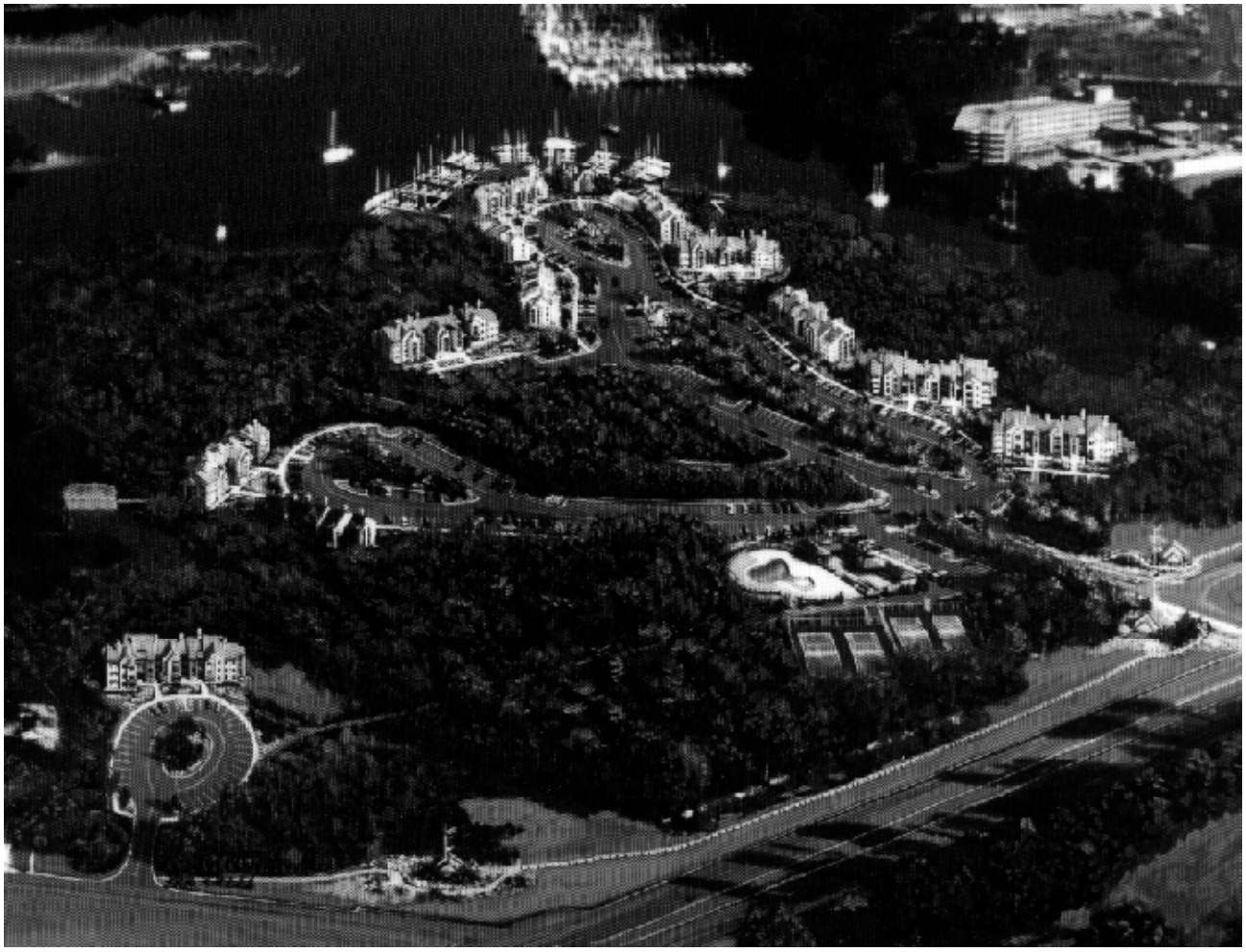
Section 1.3 of the Manual spells out the procedures for Alternative Compliance.

a. The standards contained in this Manual are intended to encourage development which is economically viable and environmentally satisfying. The standards are not intended to be arbitrary or to inhibit creative solutions. Project conditions may justify approval of alternative methods of compliance with the standards. Conditions may arise where normal compliance is impractical or impossible, or where maximum achievement of the County's objectives can only be obtained through alternative compliance. Requests for alternative compliance will be accepted for any application to which the requirements of this Manual apply, when one or more of the following conditions are met:

1. Topography, soil, vegetation or other site conditions are such that full compliance is impossible or impractical; or improved environmental quality would result from the alternative compliance.

Town Center District and a transfer of development rights program. Both resulted from the broader approach to writing the ordinance. What might have required variances or waivers elsewhere were already part of the law in Calvert County.

The Solomons Master Plan and Zoning Ordinance divides the Solomons Town Center into five planning areas. In each of those five areas are smaller sub-areas that are treated individually. This detailed approach is valuable for guiding development in sensitive and historic areas because developers know quite specifically what conditions apply in their areas and what treatments are required. For example, sketches show how to design a site for a variety of uses and building types along the shore, with variations for erodible soils, steep slopes, and flood plains.



Solomon's Landing: High density, preserved woodlands, trees in parking lots and cul-de-sacs. (Courtesy Michael T. Rose Companies and Jane Lyons Associates.)

Buildable acreage is what is left after the required percentage of open space ***or*** the acreage of wetlands, steep slopes, flood plain, and roadway/utility right-of-way--whichever total is greater--is subtracted from the gross acreage. Lots are to be laid out in the woods or along field edges, and on soils least productive for agriculture. Visual objectives are listed, too, including clustering, irregular setbacks and spacing, and preserving the dominance of natural features in the landscape.

The ordinance details the dwelling types permitted and the setbacks, lot widths, lot coverages, etc. for each, but then adds this language:

> Not withstanding the minimum lot size required in the basic zoning districts and the requirements above, if strict compliance with the minimum results in an otherwise unacceptable development design, the Board of Supervisors may permit a further reduction in the minimum lot size and area and bulk regulations so it will promote the objectives of this Article.[8]

For further flexibility, single family detached houses must be "a minimum of twenty-five percent (25%) of all proposed units" and two family and multiple family units "a minimum of ten percent (10%) of all proposed dwelling units," though the Board of Supervisors may waive the requirement if the developer shows "that the required housing types are not presently marketable."[9]

Although the Larking Hill Farm development has not been built yet, the innovative design did make it through the approval process.

Example: A Cooperative Approach to Designing an Ordinance

Calvert County Zoning Ordinance/Solomons Master Plan and Zoning Ordinance

One way to ensure that an ordinance is flexible is to write it with the help of people who must abide by it. A collaborative effort among interested parties is likely to have fewer hurdles for innovation. Perhaps it is not coincidence that some of those most proud of the environmental features of their projects are also the biggest advocates of an interdisciplinary approach to writing a zoning law.[10]

Solomons Landing's innovations did not have to fight the zoning ordinance because environmentalists, preservationists, and developers helped to write it. Solomons Landing could not have occurred without a

West Vincent Township, New Jersey

In West Vincent Township, New Jersey, the planning commission used their good judgement to protect a unique site from bad design, and later changed the ordinance so that it could deal with such situations in the future. Plans for the historic and scenic Larking Hill Farm created a small crisis for the planning commission. According to zoning, the 158 acre site could have been developed as three acre lots or as 54 lots clustered along a 6,000 foot cul-de-sac. Necessity being the mother of innovation, the planning commission said to "forget the zoning ordinance.... Do something creative with the tract."[4] In the meantime, they worked on a new ordinance that would cover the new design when it arrived. The final plan turned the farmhouse and out buildings into a village center that included "fifteen homes of various styles that will look like they have been there since the turn of this century."[5] Forty other single-family houses in small clusters will fit unobtrusively into the landscape. Open space will provide the houses with spectacular views, and undisturbed parcels will be big enough to rent to farmers.

In 1991 the Township's Board of Supervisors approved zoning changes that would allow creative design. The Visual Resource Protection Development Option ("Village Cluster") is flexible and ecological, allowing "the minimum lot area and yard requirements to be reduced so that buildings and lots can be grouped together in a configuration intended to preserve Visual Resources, provided that the remaining area is set aside and preserved as Common Open Space."[6] Eligible tracts must be at least 100 acres, zoned RC, R-3, or R-2. Depending on the zone, 50% to 80% of the land would remain open. The resources to be protected are identified on the Visual Resources Map in the West Vincent Township Open Space and Recreation Plan:

- upland areas of moderate topographical relief and broad agricultural landscapes.
- ridge lines of prominent topographical relief.
- valley floors hemmed in by ridge or upland areas.
- visually prominent wetlands and watercourses.
- clusters of buildings arranged to have the appearance of a single landscape unit.
- landscape rooms wherein vegetation, hills and ridge lines produce a narrow visual focus.[7]

Flexible Ordinances That Encourage Environmental Design

We have clearly institutionalized the art of low density suburban sprawl. If American policymakers had deliberately set out to construct the most wasteful, inefficient and land-consumptive pattern of development possible, they could hardly have been more successful.[1]

Responsible officials...no longer equate the rigid standards that conquer or subdue nature with maintaining quality development and ensuring the protection of the public welfare.[2]

Example: Flexible Administration of Regulations

Montgomery County, Maryland

After providing standards and protections, an ordinance should give the planning board discretion to approve designs that protect the environment better than the regulations. For example, Montgomery County put many of its environmental management policies into one publication. After spelling out specific details for inventorying and protecting a wide variety of resources, the manual gives the planning board flexibility in meeting environmental goals:

> The guidelines contained in this document form the basis for development and presentation of staff recommendations to the Planning Board, who may then choose to accept, reject, or modify these recommendations on a case by case basis. Exceptions to the guidelines may be given by the staff on a case by case basis where strict compliance with the recommendations herein would result in unreasonable hardship; and when it can be demonstrated that safety, county road standards, storm drainage, stormwater management, erosion and sediment control, engineering, design or planning issues can be satisfactorily addressed to benefit the environment, the general public, or both. Furthermore, staff are receptive to other ideas and techniques that enhance environmental compatibility.[3]

Streamlining was created because of the hard work of the parties involved and the trust that developed among them. Engineers and project managers appreciated prompt plan review, while county and town officials valued the developer's commitment to agreements.

Considering how bleak the site was, today's greenery is the landscaping equivalent of turning a frog into a prince. Each u-shaped group of condominiums faces the river across a grassy yard. Trees have been planted throughout the site, and a buffer created between the condominiums and the rail line. No stormwater management devices were needed on the site because the reduction in impervious surface alone lowered the Critical Area runoff by more than ten-percent. The site was also regraded to point stormwater runoff away from the river. Tome's Landing is already connected to a town park. Port Deposit is expanding the park by acquiring, through the state's open space program, even more property adjacent to Tome's Landing.

Tome's Landing did not rely on any variances or exceptions from Cecil County. The participants' approach to design and implementation created, in effect, its own streamlining, so that a project that seemed impossible at first actually proceeded smoothly.

United Dominion wanted to keep Tome's Landing on schedule. They worked with the designer, the project manager, and the local planning office to keep the project on track. The Maryland Office of Planning acted as coordinator, while the Critical Area Circuit Rider offered advice as well. The chair of the Cecil County planning commission sat in on design meetings. The participants reviewed the requirements of the various regulations, knowing in advance what hurdles they were likely to meet and how to overcome them. Adjusting the design to meet environmental objectives for such things as habitat development and impervious surfaces was especially important.

Since so much upfront work was done before the plan was submitted, the site review won preliminary approval with very few conditions attached. The developer stated clearly what he needed and had the plans worked out to support his goals. He anticipated and worked through objections, and he kept his word. Since the county planners knew that the developer was not just tossing out bargaining chips, they did not need to be adversaries. An example of this cooperation is how the sewers were handled. The town needed extra sewer capacity but had not built it yet, so Tome's Landing under normal circumstances would not have gotten a permit from the health department. But the health department allowed the project to proceed, provided that the developer was willing to risk being denied an occupancy permit should Tome's Landing be finished before the sewers were. The developer agreed. To help the county finish the sewers (and keep his project on time), the developer paid connection fees up front.

The Tome's Landing project, 170 residential units on 17 acres, sought to redevelop an industrial site between the river and the train tracks, where the Wiley Manufacturing Company made steel tunnel sections and floated them on barges to Baltimore. Even after the industrial buildings were torn down, the landscape was covered with concrete and steel, and the land not under concrete was compacted so tightly that it resembled concrete. A natural shoreline did not exist, having been replaced by bulkheads.

The new owners of the site, United Dominion of Canada, adapted its plan to the town's revitalization plan, and kept two public amenities in mind:

1. The retention of viewsheds. The placement of the buildings allows views of the river from Main Street. In addition, the entrance to Tome's Landing clearly invites pedestrians as well as vehicles. A waterfront park and piers are open to the public.

2. Construction of a riverwalk. The 2,900-foot promenade runs along the whole site and into town.

Tome's Landing in Port Deposit was a former industrial site. Note the density, landscaping, and open views from Main Street.

neath through a layer of oyster shells and gravel. No stormwater ponds had to be built and no trees cut down for that purpose. By eschewing a concrete slab foundation, which usually requires a clearing 15 feet beyond the footprint, the developer could leave trees standing as close as two feet from the walls.

A tree survey was conducted on the site (prior to the enactment of the Forest Conservation Act) and a tree preservation program devised. Nature led design: house siting was guided by the tree inventory and root system maps. The site had been heavily logged in the past, so the developer brought in over 300 mature trees from another place, and planted nursery stock also. Trees were also spared during shore stabilization: rather than truck the stone through the site and work on the shore from the land side, the stone was put onto barges and spread from the Bay side. This method ended up being ten or fifteen percent cheaper.

Work crews were trained in special construction techniques to preserve the site. Builders used factory-built panels and lowered them into place by crane. Because no scaffolding was used, trees could be saved very close to the buildings. Fencing along the edges of house clearings protected the forest and cut down on silt. Temporary sediment traps filtered runoff.

At Solomons Landing, the developer planned wildlife habitat enhancements. The National Institute for Urban Wildlife certified Solomons Landing as one of 57 urban wildlife sanctuaries. Some enhancements made good use of the detritus normally found on construction sites: rock and brush piles became homes for small mammals, reptiles, and amphibians; logs were left to attract turtles, small mammals, and reptiles; dead trees became perches for hawks, ospreys, and kingfishers.

Restoring Degraded Sites

Tome's Landing in Port Deposit, Cecil County, Maryland

Even though Tome's Landing sits in a floodplain, it shows how a severely degraded site can be environmentally restored. It is a good precedent for growth areas that are being redeveloped. In addition, the review process was streamlined thanks to cooperation between the developer and public officials.

Port Deposit is a linear town along the Susquehanna River. Railroad tracks parallel the river. Beyond the tracks is Main Street, then the granite cliffs. Sitting between the river and the cliffs, the town is less than 1,000 feet deep. The site is environmentally sensitive, and physical constraints are tight.

Northridge used other site-saving techniques. Barbed wire separated construction sites from tree preservation areas, and vehicles were parked in one spot to isolate oil leaks and soil compaction. Cement trucks were washed out only in specified locations.

Solomon's Landing in Solomons, Calvert County, Maryland
Solomons Landing provides 234 units clustered on portions of a 34 acre site. In order to achieve condominium density that would make environmental design economical, the developer purchased transfer of development rights and got town center zoning from the county. Such density also made water and sewer service feasible. Buildings at Solomons were placed on three-foot-high pilings so that storm water could drain under-

Solomon's Landing. Houses can be built very close to existing trees.

Regulations	Developer's Design
Grading	
The Grading Ordinance of Prince George's County states that "slopes, terraces, or banks within residential areas can be regraded to a ratio no greater than 3:1." Elsewhere it calls for consideration of the existing topography and the retention of "'the natural contours, specimen trees and terrain features." The two regulations appear to contradict one another.	Since a 3:1 slope will often wipe out vegetation, "Northridge proposes the use of 2:1 slopes with the understanding that these slopes, once graded, will be stabilized with fiber mats or netting and then planted with perennials or wild flowers or dense ground cover or woody shrubs. The use of 2:1 slopes will minimize disturbance and save more existing trees."[7] Soil tests reveal that the land can support these slopes. The stabilized slopes will require little or no maintenance.
Setback of Building from Building Pad	
This rule requires a minimum ten-foot shelf around a residential building pad. But a ten-foot clearing destroys trees and takes a house out of a natural setting.	A four-foot minimum clearance is feasible for the sides of single family detached houses and the ends of a row of townhouses. The developer requests a four-foot minimum requirement for a building pad shelf, which retains more of the existing trees and plants, prevents unnecessary grading, and keeps the house close to its natural surroundings.
Cul-de-Sacs	
Pavement required.	The developer proposed landscaped islands at the end of cul-de-sacs. These would contain trees and shrubs that had been preserved or mature trees that had been transplanted. The design would eliminate mandated expanses of pavement but not hinder emergency vehicles.

Drawing of Northridge grading proposal. (Illustration courtesy of Michael T. Rose Companies.)

Drawing of Northridge street proposal. (Illustration courtesy of Michael T. Rose Companies.)

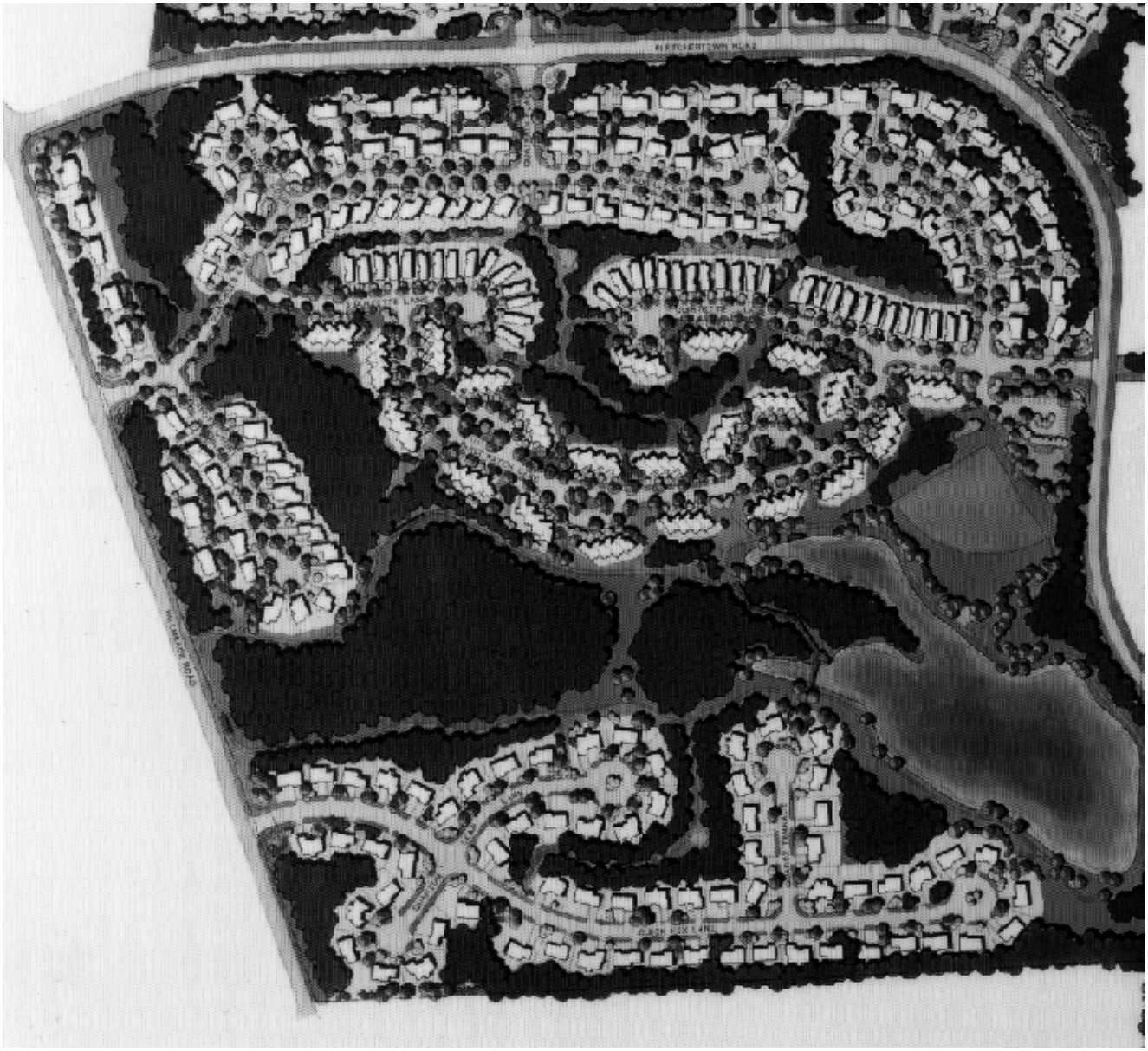
Regulations	Developer's Design
The Bowie City Code, Section 22-40, says, "Curbs, gutters, and sidewalks shall be required along any road where the majority of individual lots abutting on such a road have a frontage of ninety (90) feet or less." Required are 26 or 36 feet of pavement (for a fifty- or sixty-foot right-of-way, respectively), a seven foot planting strip and four foot sidewalk on either side. But this would collide with the developer's creation of rural lanes rather than suburban streets.	The developer proposed 18 or 24 feet of pavement bordered by a grassy shoulder and drainage channel, with existing trees beyond. Slope stabilization will prevent runoff and erosion, while natural swales provide drainage. The developer proposed modifications in curbs and reduced centerline radius criteria (which would allow tighter curves) in order to preserve rural atmosphere. The uncurbed lanes would protect more trees and allow greenery right up to the asphalt's edge. Curbs and gutters would be replaced in all but the higher density housing areas with a softer, greener alternative. Flow in the swales will not exceed 10 cubic feet per second, at a rate not to exceed four feet per second. For slopes less that 2%, an underdrain will be used instead of the typical concrete ditch.
Sidewalks required.	A trail system to take advantage of the natural setting. In places where the trail would connect to a 60 foot right-of-way, the developer proposed that the trail design take the place of standard sidewalk.

clusters be allowed. Not only would the results look more natural, but existing stands of trees would remain. Street lighting would complement the setting, and concrete driveway aprons would be left out.

3. The use of an urban forester to survey and delineate significant trees and stands of trees. "Then, through avoiding those areas by design, by working around them during construction, and by transplanting trees from one area to another, mature vegetation areas can be preserved or used to enhance specific portions of the site."

Below is a comparison between what the regulations required and what the developer proposed.

Regulations	Developer's Design
Roadways	
The Prince George's road ordinance requires that Fletchertown Road and Hillmeade Road, presently 64 feet wide, be expanded to 80 feet and "suburbanized": "If this ordinance is rigidly applied, the gentle swales and impressive tree stands would have to give way to four lane roads with expanses of pavement as well as curbs, gutters, and sidewalks."[6] The natural setting would be obliterated.	The alternative is an 80-foot right-of-way with rural character intact: instead of 52 feet of pavement, 24 feet of pavement, with shoulders 10 feet wide on either side. Instead of sidewalks and street trees, a grassed drainage channel and the existing trees left as is.



A section of the Northridge plan. Note the preserved trees and open space and the high densities. (Courtesy of Michael T. Rose Companies and Jane Lyons Associates.)

The developer assured that clearance would be minimal by staking out the homesites and spray painting the perimeter. An orange tree-protection fence was erected to mark the boundary, and trees that had to be removed were lifted out vertically to prevent damage to their neighbors. Rubber wheeled vehicles did the tree removal. The stone base to the driveway was laid down so that construction equipment would use it and not wander onto the brush. The developer never had to impose penalties for tree damage because the challenge of using new techniques was itself an incentive to do things right.

At Woodholme, storm drains were threaded through the trees, so tree clearing was unnecessary. Again, the contractor enjoyed the challenge of how to stage and drive his equipment to carry out the project. On the part of the site that used sewer, trenchless technology for two-inch sewer mains bore holes, making trenches unnecessary.

Northridge in Prince George's County, Maryland

This 855-unit mixed use development, on approximately 350 acres, is being developed by the Michael T. Rose Companies. To persuade county officials that the rural atmosphere of Northridge was being hurt by current regulations, the design proposal included a rundown of specific regulations and how Northridge improved on them.

The proposal described how the natural features would be ruined by following the rules: "Gentle hills give way to massive four-lane roadways, wide expanses of pavement, and concrete curbs, gutters and sidewalks. Furthermore, regrading of a site, using rigid guidelines which have not been thoroughly evaluated for their impact on the environment, destroys trees, exacerbates soil erosion, and distances a community from any sense of what was its natural surroundings."

The developer's approach had three parts:

1. "[T]he plan establishes a series of development design standards that complement each other and the land..." If these are not approved, much of the existing landscape will "have to be destroyed during the development process and replaced with new, immature vegetation."

2. Landscape guidelines, "which encompass everything from trees to driveways to street lights and intersections, are designed to foster a more natural feeling." The regulations call for trees to be planted in a row along the street, but the developer proposed that

dinary from their setting, and they did. The parking lot ends where the stands of trees begin, and the approach road was routed around the trees. The road was not dug into the ground but laid over the surface so that it did not compress or cut tree roots. (The system was similar to that used at Grey Rock, mentioned previously.)

McDonogh's conservation guidelines required less parking than the public regulations. The result? Trees have been spared, and everyone who needs a parking space can still find one. Underbrush in the woods has been carefully cleared to allow desirable species such as rhododendron to return. The verdant setting provides a soothing view and creates a valuable amenity: a shady patio that employees can use even on the hottest days. On most corporate campuses, workers would broil because the trees have been destroyed.

Residential Development

Woodholme in Cecil County, Maryland

This development incorporated some environmental features that are tricky to pull off. But it is a good example of regulatory streamlining that permits environmentally sensitive design.

This site covers 600 acres, 100 of which had been mined for sand and gravel, then reclaimed. The other 500 acres comprised one of the largest forest stands left in the northern Chesapeake area. These woods were prime habitat for interior dwelling birds. Development was also constrained by well and septic requirements.

The land led the design from the start. First, the developer concentrated on the cleared space and minimized forest clearance. Second, the lot lines followed the septic field tests, not vice versa. Also, the road layouts were altered to accommodate terrain and existing trees.

The tree saving techniques at Woodholme were many. County road standards require a fifty-foot right-of-way with thirty feet of paving; grade alterations would have brought the total clearing to eighty feet. The developer got the paved section reduced to twenty-four feet. In another ecological alternative, the utilities were buried in a trench alongside the road, and sidewalks were laid only on one side. Cul-de-sacs had no sidewalks at all. As a result, the total road clearance was fifty rather than eighty feet. The old haul road for the quarry became the main road for the development, saving more trees. Doing the right thing environmentally also had economic advantages: the houses-in-a-forest had more marketing appeal, and the developer saved money on grading.

Two objections to using Merck as an example can be raised: first of all, a ten ton gorilla is going to trample the daisies no matter how daintily he steps, and the Merck building, no matter how well designed, has huge impacts. So is it silly to describe this complex as an environmentally sensitive design? Not necessarily. Large companies are going to build large buildings; one need only imagine what the site would look like if those 1,300 trees were not replanted and that 700,000 square feet of parking were laid on the surface instead of hidden underground. And what would the implications be if Merck had wanted 400 acres of grass rather than trees on its site?

The second objection is that most places are not going to have a development as big as this, nor a client with the money to pay for such landscaping. Maybe. But Merck no doubt was concerned about its image. It also took pains to create a pleasant place for its employees. These impulses can live in smaller companies.

A member of the Hunterdon County Planning Board said that thanks to Merck's efforts, other developers find the area attractive and speculative developers nearby have raised their standards.

Baltimore Life Insurance Company, McDonogh School Property in Owings Mills, Maryland

Baltimore Life provides a good example of how good design makes regulation moot by exceeding the standards of the regulations. Trees on this site were saved as close as eight feet from the building. Even the Forest Conservation Act gives no credit for trees saved within 35' of a building--the theory being that attempts to save trees closer than that are likely to fail. In fact, developers who do want to keep trees that close to buildings often need waivers.

In the 1970's, the McDonogh School trustees decided to develop much of the school's acreage. Since Owings Mills was designated a county growth area, the trustees reasoned that the school, through long term leases and strict development guidelines, could control the future look of the landscape. Otherwise, those decisions might fall to county planners and the county's power of eminent domain. Tenants have to adhere to McDonogh's Design Review Committee guidelines on tree preservation, wetlands protection, appearance, pedestrian use, and limits on parking spaces. This secondary review process, not the government regulations, change the results from ordinary to noteworthy.

Baltimore Life Insurance Company wanted to create something extraor-

with blacktop, you've really lost the aesthetic advantage of your unspoiled site. This way, employees can look out their windows into the woods, which is incomparably more attractive than a parking lot.'"[3]

Merck's design and construction techniques spared a lot of trees. Roads were routed to avoid them, and over 1,300--some as tall at 40 feet--were moved to an on-site nursery during the two years of construction, then replanted. Merck fenced off the land that did not need to be disturbed during construction. Every worker was trained in the rules for working the site, and saw a video about the company's goals for the project.

Since Merck's design was so ambitious in its environmental protections, the town did not need a flexible ordinance to encourage them. What did speed the approval process for Merck was that they worked with the planning board for a year before submitting plans. When changes were required Merck made them quickly.[4] The outlook of the planning board also allowed the innovations. Rather than get bogged down in the letter of the law, the board looked at the intent of the developer and the intent of the ordinance, and decided that it made sense to work with a plan that had fewer impacts on the environment than the law required. Why make someone cut down trees if they don't have to?[5]

Corporate Headquarters of Merck and Company, Inc., Whitehouse Station, New Jersey. (Photo courtesy of Merck and Company, with permission from Kevin Roche John Dinkeloo and Associates.)

*Sound environmental design begins at the earliest stages in planning a building. In a real sense, it **informs** the entire process from predesign through construction and day-to-day maintenance.*[1]

Examples of Environmentally Sensitive Development

Recreational Development

Queenstown Harbor Golf Links, Queen Anne's County, Maryland
Near Queenstown, Maryland, a 27 hole golf course was built on 147 acres. The land lies within the Chesapeake Bay Critical Area. The Critical Areas Commission determined that a golf course, properly designed and managed, might do even less harm to water quality in the Bay than did the original farm on the site.

This golf course illustrates many of the points made so far: developers are preserving more of the environment, using natural features to create dramatic and valuable amenities. Changing tastes are leaning toward good ecological design, which can protect the landscape better than what would have been permitted under standard rules.

In times past, a golf course fairway had to be as green as Astroturf, the turf as level and smooth as a Marine buzz cut. Such a look could be achieved only with heavy doses of pesticide, herbicide, and fertilizer, resulting in a loss of habitat and biodiversity. Today, "the manicured portion of the course [is reduced] to the minimum required to play the game, and...the rest [is treated] as wildlife habitat, meadow or forest."[2] Even dead trees are allowed to remain as homes for birds and other wildlife.

Areas left alone on the Queenstown course, such as the 300 foot buffer along the shore, are covered in wildflowers. Flora of this kind is self-sustaining, requiring no chemicals or manpower or expense. Other attributes of a wild course--nesting boxes, native plants, natural landforms, wildlife--are things that people want to see.

Corporate, High-Tech, and Commercial Development

Merck and Company, Inc. Corporate Headquarters in Whitehouse Station, New Jersey
The world's largest manufacturer of prescription pharmaceuticals, Merck moved into a 460 acre site and a 1,000,000 square foot building. An additional 700,000 square feet was needed for parking.

The hexagonal Merck headquarters occupies an enormous footprint, yet the site remains wooded. A five acre courtyard has kept original stands of trees. Perhaps the most important environmental feature--and the most expensive--involved putting the 700,000 square feet of parking underneath the building. Said one company executive, "'If you go to all the trouble of building in the woods, and then surround your facility

Suppose a street starts at the bottom of the hill and runs up: if the blocks are long, a lot of grading is required, especially for rear alleys and garages. If intersections occur more frequently, houses fit better into the elevation changes.

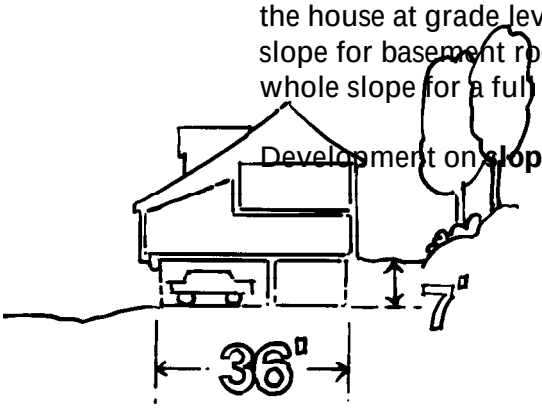
The contours of the land should dictate building style and density. Such an approach not only prevents erosion, sedimentation, and other drainage and settlement problems, but allows "unique and attractive house lots...with winding lanes and unexpected vistas that add greatly to sales appeal."[17] Houses that face uphill should be designed differently from houses facing downhill.

0-5 percent slope -- With good drainage, almost any density, building type, or floor plan will work. (0-8 percent is best for roads; 2-8 percent for houses.)

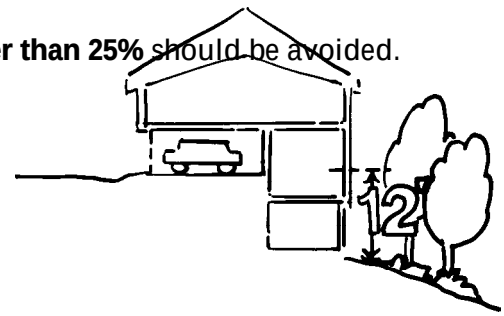
5-10 percent slope -- Depending on the slope, road grade, and whether or not retaining walls can be used, houses can be terraced on narrow lots, the lengths of the houses running along the contours. On sites where steep slopes occur on the edges, clustering on the flat portions works well. Duplexes can also be terraced, with width determined by the slope gradient. Side and front garages can be alternated from unit to unit, which not only improves the design but provides variety as well.

Above 10 percent -- If the slope runs from the front up the back, houses should be wide. If the slope runs steeply downward at the rear of the house, one should work with the grade: keep the rooms at the front of the house at grade level while scooping out a minimal part of the back slope for basement rooms. This is a better solution than digging out the whole slope for a full basement.

Development on **slopes greater than 25%** should be avoided.



This home on a 15% uphill slope picks up grade by digging the garage into the hillside. Wide, shallow floor plans work better than deep plans on front-to-back slopes like this one.



Here the gradient is 20% with a down-slope drop. A level, at-grade entry with volume built into the down-slope side of the house takes advantage of the grade change instead of fighting it.

Designing for sloped sites. (Recreated from the July 1991 issue of *BUILDER* magazine, © Hanley-Wood, Inc.)

fertilizer have profound effects on the feeding, spawning, and habitat grounds of fish and wildlife. Finally, toxins and chemicals found in sewage and fertilizer are harmful to plants and wildlife. Herbicides that wash into the water can kill the plants altogether.

Fertilizers should be applied according to soil test recommendations and plant types. Plants native to the area, or other species that do not require much fertilizer, should be used for stabilizing the soil on site.

Habitat

To protect wildlife, especially rare species:

- Native vegetation should be preserved.
- As much as possible, parcels should remain with their undisturbed portions connected to one another. This design feature keeps large areas of the landscape intact for species that range far. If habitats have to be divided, a wooded corridor to connect the pieces becomes an avenue on which animals can pass. The development should also be connected at its edges to natural areas beyond. The land's connection to surface water should also be kept, so that wildlife has access to water.
- Fences, roads, bulkheads, and clearings should not hinder the movement of wildlife.
- Development should occur on the least productive soils found on site.
- Uses that create a lot of noise should be kept far from habitats. The natural shape of the land can often be used for blocking noise, as can dense and wide plant buffers.
- Development should occur on the most common habitat (if it is otherwise suitable). Margins where one type of landscape meets another are especially rich in diversity, so the transition zones between forests and fields, and forests and wetlands, should be preserved. Small, unique areas should be preserved as well.

Steep Slopes

Saving habitats is also useful for preventing erosion and reducing storm-water runoff.

Erosion and Sedimentation

Boards should have spaces between them, allowing the rain to fall on the six to twelve inches of uncompacted gravel underneath. Three feet of low growing evergreens or woody deciduous plants should be planted along the downslope edge of the deck.

The slope of the land, the erodibility of its soil, and the amount of rainfall all contribute to erosion and sedimentation, but perhaps the biggest cause is how badly soil cover is disturbed during development. Sensitive design for erosion control has two objectives: 1. to limit exposure of bare ground to the elements; 2. to catch and collect sediment so that it does not clog streams or wetlands. Sediment blocks the light needed by subaquatic vegetation, and can more directly harm such plants by burying them. In Chesapeake Bay, oysters are enormously susceptible to changes brought by sedimentation. The silt smothers them.

Some general design principles can serve these two objectives:

- Highly erodible soils, soils with low permeability, high water tables, steep slopes, and long slopes should be avoided. If some disturbance is unavoidable because these conditions occur in growth areas, the suggestions below can do much to mitigate the damage.

- Ground clearance should be limited to just the footprint of the building and the land needed for drainage and traffic. Areas cleared for parking, for example, can double as storage areas for equipment during construction.

- Grading should be limited. The contours of the landscape should be respected, with roads put on the gentlest slopes possible. The crossing of drainage channels should be avoided.

For retaining sediment, wide natural buffers are useful downslope from the site to separate the it from drainage channels. Buffers are also useful upslope from the site to keep water from flowing down through it. Sediment trapping devices should stay close to the disturbed area.

Nutrients from Sewage and Fertilizer

An overabundance of nutrients can harm a stream, wetland, or lake--even the Chesapeake Bay--in many ways. First, the nutrients accelerate the growth of algae and other aquatic plants which, when decomposing, use up the oxygen that fish need. Second, the nutrients change the mix of microscopic plants and animals on which newly hatched fish feed. Changes in water temperature and clarity caused by the sewage and

Runoff from roofs can be handled by sheet-flow spouting, French drains, and dry wells. The physical suitability of the site, soil type and drainage characteristics, space restrictions, and ability to remove pollutants all help determine what type of system to use.

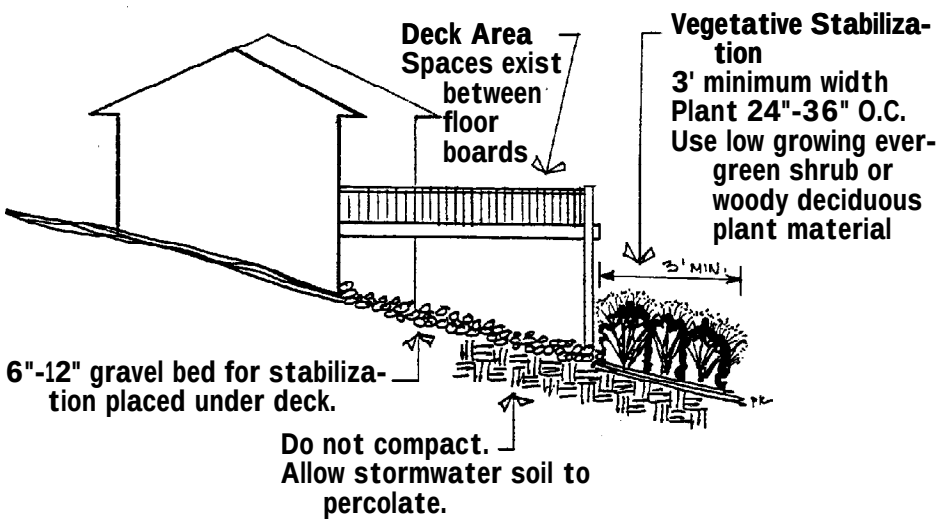
Driveways

Driveways can be narrower and shorter than usual. Gridded pavers or porous pavement can be used for the seldom used parts. Asphalt driveways can be flanked by gravel beds three feet wide and four- to six inches deep, with turf beyond the gravel. The gravel bed slows down runoff and traps sediment. A driveway can be made from two parallel strips of pavement, wide enough to accommodate car tires. Asphalt, gravel, concrete, or turf blocks can be used; grass can grow between and outside the pavement strips. A grassy swale for runoff can be planted alongside a driveway having a slight crown to it.

Paths and Sidewalks

Widths and lengths can be decreased. Gaps between paving stones or other methods of alternating pavement and vegetation can be used as an alternative to a 100 percent impervious surface. Fieldstones or clay or concrete blocks can be interspersed with turf as a substitute for asphalt or cement.

Decks



Managing stormwater from decks. Illustration from *Applicant's Guide for 10% Rule Compliance* (Chesapeake Bay Critical Area Commission).

erly. If the grass cannot establish itself because the sides of the swale are too steep, and the runoff comes from a steep slope right above the swale, then the swale is likely to erode.

These strategies are influenced by the infiltration rate of the soil, the depth of the water table, and the amount of land available for infiltration devices, ponds, or marshes.

Stormwater management is an easy place for environmental design. Rather than be a hole with a fence around it, a stormwater pond should be an amenity. A square pond can be graded, surrounded by plants, and beaded with nest boxes. Ponds can be made in various shapes, can include wildlife habitat, and can supply views that vary from place to place on the site. Channels do not have to be straight and flat; they can be curved, and use dips and mounds to create permanent wet and dry spots to accommodate a variety of plants and animals.[15]

Advice on how to reduce the pollutant load of runoff by ten percent (in intensely developed areas that are being redeveloped or adding new development), can be found in the *Applicant's Guide for the 10% Rule Compliance* (Chesapeake Bay Critical Area Commission). For residential development, concerns about stormwater runoff carry through four levels: site design; rooftop drainage; roads, driveways, and sidewalks; and decks.

Site Design

Land planning techniques prevent runoff at this level by limiting the area of disturbance and the percentage of impervious area created.

- Site fingerprinting limits land disturbance to just ten feet beyond a structure's footing (if setback and fire regulations permit. If they do not, they should be made more flexible).

- Native vegetation should be kept. It absorbs more water and requires less fertilizer and pesticide than grass does.

- Impervious surfaces should be limited to fifteen percent of the site.

- Roads can be made narrower.

Reducing impervious surfaces through narrow streets and shared access lanes does provide an economic incentive: with less surface area covered by asphalt, more can be covered by house.[16]

Rooftop Controls

sedimentation, and nutrients from sewage and fertilizer--can be lessened by good design on steep slopes, in forests and habitats, and near wetlands. The following suggestions appeared in *Guidance Handbook: To Help Local Governments Make Site Specific Findings Affecting the Initial Chesapeake Bay Critical Area* (MD Dept. of State Planning, April 1985), unless otherwise noted.

Runoff

When rain water flows across roads and parking lots, it carries oil, gasoline, and other contaminants into surface water. When rain runs too quickly down steep slopes, it erodes the land, carries silt into surface water, and scours stream banks. Water racing downhill does not seep into the soil to nourish plants, fill the upland water table, or feed non-tidal streams during dry periods.

The most polluted runoff occurs at the beginning of a storm, and a few development principles can go far to contain it:

- The first 1/2 inch of runoff falling on impervious surfaces during every storm should be infiltrated. Dense soils, high water tables, and some uplands make natural infiltration unfeasible, so infiltration devices, wet ponds, or shallow marshes can be designed. However, it is better if the stormwater pollutants from a large impervious surface are absorbed and removed before they collect in a small pond or marsh which might be overwhelmed by the flow. Concentrated stormwater flows should be avoided.

- Impervious surfaces should be kept to a minimum. Big surfaces can be broken up into smaller units to allow local infiltration. Access roads and driveways can be kept short, with parking lots no bigger than they need to be. (Regulations that govern the size of parking lots are just the type of constraint that needs to be more flexible.) Permeable materials can be used on lots and driveways. Increased building height can reduce surface area.

- A buffer of plants and trees should be placed between impervious surfaces and the waterline. Dense vegetation alongside impervious surfaces can catch water that runs off in sheets.

- Excess runoff should be recharged as close as possible to where it fell as rain. This limits the cost of carrying the water away and the danger that high water volume or concentrated pollutants can overwhelm the systems on the receiving end.

- Grassy swales and gravel packed trenches can be used for channeling runoff. Grassy swales, however, must be designed prop-

Wetlands

put 106 attached houses on 12 acres.

In 1984, the U.S. Fish and Wildlife Service estimated that over half of the 215 million acres of wetlands that existed before European exploration had been drained, dredged, or paved by 1975. It has been estimated that 95 percent of the remaining wetlands are nontidal freshwater fens, marshes, and swamps. Creating new wetlands to replace developed ones is a risky strategy. It trades "the certainty of destruction for the mere promise of replacement," according to *Planning* magazine in February, 1989.

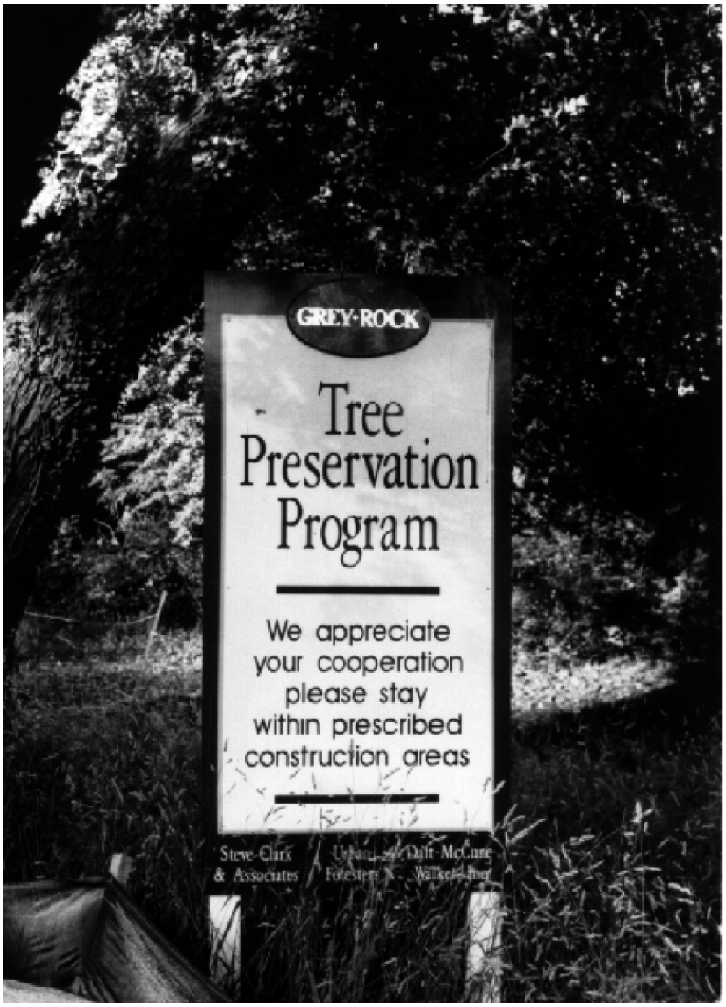
Nontidal wetlands control flooding, replenish subsurface water, filter runoff of polluted surface water, provide a home for rare plants and animals, and are rich feeding and breeding grounds. The first advice for developing near wetlands is to stay away from them by clustering development elsewhere on the site. Cluster development requires less clearing and grading, and the smaller amount of impervious surface results in less runoff. Clustering should be allowed for all the densities and building types that the zoning allows.

By knowing the topography of the site, one can spare the existing stormwater runoff and collection patterns. Since new runoff is likely to contain contaminants that might upset the ecological balance in existing wetlands, it should be channelled to new collecting areas. If roads and bridges must be put in the wetlands, they should intersect the wetland at the narrowest part.[14]

New methods for constructing utility lines in forests also work in wetlands. For the Cross-Jersey Trail, Greenway and Natural Gas Pipeline, built by Columbia Gas Transmission Corporation in Hunterdon and Morris counties, New Jersey, Andropogon Associates followed a historic railroad right-of-way in the wetlands. The construction zone was only thirty feet wide, so construction equipment worked on top of the spoil removed from the trench. A silt fence stood inside a barrier fence on both sides of the right-of-way, protecting the wetlands beyond.

Water Quality

The protection of sensitive areas has a direct impact on another crucial natural feature: clean water. Water quality is perhaps the best example for showing how sensitive treatment of one natural feature can help another. Four threats to water quality--surface runoff, soil erosion,



Trees can be protected by clearly marked boundaries to the construction area and by training for construction workers.

compression. As a result, trees thrive right next to the road. Boulders at the roadside rather than curbs keep vehicles away from the trees yet don't harm them as curbs would.

Lyons Manor (Lyons Mill Road, Baltimore County)--140 mature trees on this site were uprooted and replanted. Each yard now has a mature tree on it. Moving mature trees can be cheaper than planting new ones, and, in addition to being bigger and prettier, mature trees are already adapted to local conditions. Care should be taken to avoid root damage and other shocks to the trees.

Park Caton (Senior Adult Housing, Maiden Choice Lane in Catonsville)--The building's placement on the site was adjusted to save a mature dogwood tree, which is now a dramatic focal point in the design.

Tree preservation is not just for high-end developments. A Global ReLeaf award was given to a development in Island Lake, Illinois, that

TREES ARE PORTABLE. Maybe not Sequoia redwoods, but virtually any tree can be picked up and moved. Naturally, great care must be taken to reduce the strain on mature trees, especially root loss.

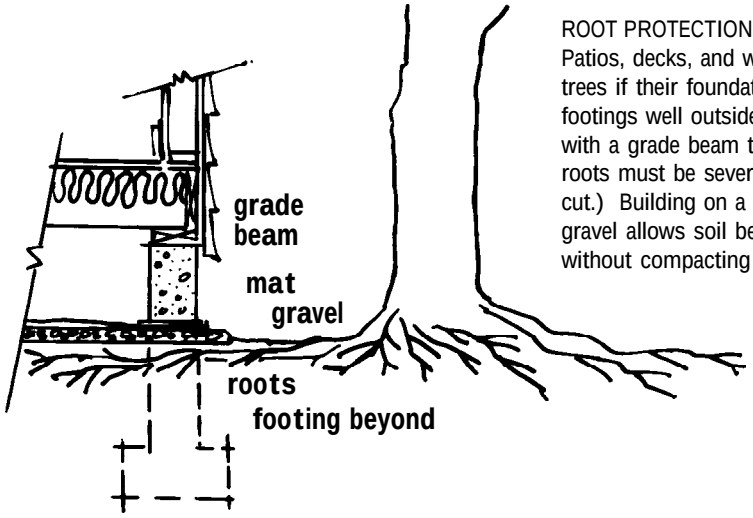
Examples provided by Daft, McCune and Walker, a firm in Towson, Maryland, show some of these tree saving techniques at work.

Grey Rock (Reisterstown Road outside the Beltway in Baltimore County)-- This development used an effective tree preservation strategy for its roads. A clear, permeable membrane was laid on the road bed. On top of that was laid a network of plastic pipes with vertical members serving as vents. Gravel was spread on top, then the road surface. The trees can get air and water this way and their roots can grow normally, free from

Grey Rock. High density on part of the site preserves open space and old trees elsewhere.

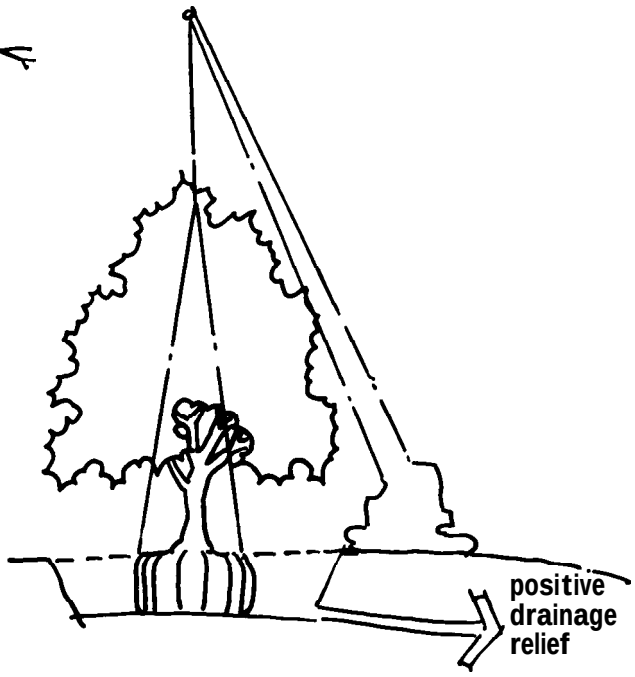
system that disturbs the terrain less and also uses the site's natural water courses and filtration. Stormwater facilities should be buffered by forest and landscaped with wetland trees, shrubs, and plants.

Other design features can save trees. Wide strips of untouched ground can be left between the backs of houses--20' or even 100', if the site permits--to be shared in common. (If the strips are too narrow, however, homeowners might clear them for play areas or other yard uses. It helps if the land is deeded to a homeowners' association that guarantees its maintenance and its use as community space.) Trees can screen the front of houses from the road as well.[13] To protect root zones, buildings can be elevated above grade. As for patios and decks, they can be built close to trees by using footings that lie beyond the root zones and beams that span the root zone.



ROOT PROTECTION
Patios, decks, and whole buildings can be built close to trees if their foundations span the root system. Locate footings well outside the root zone and connect them with a grade beam that "floats" above the root area. (If roots must be severed, use a vibratory knife for a clean cut.) Building on a geotextile aeration mat on top of gravel allows soil beneath the structure to breathe without compacting nearby roots.

RELOCATING TREES
Trees of virtually any size can be relocated, provided that a large enough root ball is dug and there's adequate moving equipment available. As a rule, the root ball should be 10 to 12 inches in diameter for every 1 inch diameter of tree trunk. The hole into which the tree is placed should be wide enough to accommodate plenty of good topsoil backfill around the root ball. Dig a downward-sloping trench drain system in the base of the hole to allow for adequate drainage.



Tree-saving techniques. (Recreated from the July 1991 issue of *BUILDER* magazine, © Hanley-Wood, Inc.)

Stormwater Management Fingerprinting

Stormwater management facilities can be fingerprinted around priority forest retention areas in a variety of creative designs. (Illustration from the *Forest Conservation Manual)*

and rootstocks--using a specially modified front-end loader and reset as the pipeline progressed. The park was quickly restored, leaving no scars from the construction."[12]

Trenchless technology, such as that used for the two-inch sewer mains in the Woodholme development (described below) bores holes that make trenches unnecessary.

Stormwater

Stormwater facilities are usually located at the lowest point of a site--exactly where many prime stands of trees like to grow. Stormwater treatment should avoid priority woodlands, limiting the replacement of trees by man-made systems. A "dry" stormwater system that discharges into the woods avoids the construction of other devices, but only if the forest can tolerate flooding. Stormwater flowing to wet ponds can follow the natural hydrology of the site, or else be routed around the sensitive forest altogether. One big retaining pond can be replaced by a two stage

Illustration from the *Forest Conservation Manual* shows stormwater management that protects trees.

Grading

Natural slope and drainage patterns should be kept whenever possible, especially on steep slopes. Waivers to grading requirements should be sought for the highest priority forest areas. If a waiver is not possible, a retaining wall may satisfy both grading and tree preservation objectives.

Roadway Design

Rather than cut trees that block the right-of-way, the right-of-way should be designed to save existing trees. Rather than being flat, straight, and wide (and boring), roads can follow grades, respect contours, run along ridge lines, and save natural features. In other words, engineering does not obliterate nature, engineering follows nature. Narrow road cuts also prevent a lot of grading and earth moving. "This type of design also allows for natural drainage off the road surface and minimizes the need for ditching and expensive storm drainage."[8] If one driveway can serve two houses, it spares trees and reduces impervious surface. The space is wide enough for construction equipment and allows one utility trench to serve two houses.[9]

The rationale behind parking lot design can spare many trees. "Because parking areas are often five times larger than the area of the buildings they serve, it makes sense to build parking lots on existing contours and then cut or fill the ground for the building if necessary.

"The motto is don't clear anything unless absolutely necessary."[10]

Utilities

For gravity-driven utilities that cannot be kept away from forest retention areas, the highest priority stands of trees should be spared. The *Forest Conservation Manual* advises, "specifications for public utility easements should be evaluated for their sensitivity to forest preservation goals." In fact, utility easements can be eliminated if all utilities are placed along roadway easements.[11]

Techniques and equipment tailored to the site can narrow the width of the cut, decreasing the amount of land disturbed at one time. To limit damage from the laying of utility lines, Andropogon Associates of Philadelphia is an innovator. In Morris County, New Jersey, the Algonquin Gas Transmission Company routed a pipeline through a park. The swath of land disturbed for construction was narrowed when dirt removed from the trench was spread along the right-of-way and construction equipment rolled along on top of it. The pipe was welded in the trench. "The forest floor was removed in large blocks--18 inches of soil

causing properties to move faster on the market than sites with fewer or no trees.

The simple fact is that businesses who do more than the minimum to protect and conserve the environment will carry increasing weight in tomorrow's business and regulatory climate.

Let the land shape your plan.

Forest

Trees are in these days, and 'slash 'n' build' is definitely out.[6]

Sometimes bulldozing every tree on site confers an air of legitimacy to a project, and obliterating every woody molecule signals that a project is moving ahead. But what practical consideration requires such a heavy hand?

The developer has a greater effect on trees than the builder and subcontractors do, because the developer decides roadway placement, lot size, grading, and type of building. Plans should aim to save existing trees. When doing a tree survey, tree specialists tag individual trees and stands of trees according to species, age, and health. Trees and root systems are mapped, and the project is designed around the trees.

"Younger tree stands...can tolerate more damage, so higher-density housing such as condominiums and town houses can be located near the younger trees.... Conversely, single-family detached homes are planned for areas with mature stands...."[7] The site should be studied for the possibility that streets and lots--even golf fairways--can fit in spaces already clear or relatively so.

The *Forest Conservation Manual: Guidance for the Conservation of Maryland's Forests During Land Use Changes, Under the 1991 Forest Conservation Act* (Metropolitan Washington Council of Governments, 1991), from the Maryland Department of Natural Resources, has good ideas for designs that save trees. In addition to saving woodlands through clustering development, building sites can limit forest clearing to only five or ten feet beyond the building's footing, *if regulations for setbacks and fire safety permit*. Construction access roads can be limited, used later for roads and utility channels, while impervious surfaces can be minimized. Below are other ideas.

Let the land shape your plan.[2]

Designing to Preserve Sensitive Areas

work backward to the site, lots, and streets.

Streamlining regulations for the sake of economic growth need not hurt the environment, but only if good design can accomplish the goals of regulation. Therefore we will look at sensitive areas--forests, steep slopes, wetlands, and wildlife habitats--and describe safe ways to develop there, some of which run counter to present land use regulations. By recognizing which design elements are good for the environment, public officials can grant quicker approval to innovative projects, thereby supporting the twin goals of encouraging economic development and protecting the environment.

But first things first. Why would a developer want to design ecologically? Because it sells. *Builder* magazine in July 1991 summed up the trend this way: "Development pressures have led to building on many previously passed-over sites full of environmental challenges. Rather than obliterate their features, today's savvy builders see in such sites a host of natural resources that can be marketed as part of the community amenity package."[3] After all, it's not location that makes a house but its *setting*, and the best way to achieve natural beauty is to keep what you start with. Rock outcroppings, stands of trees, lakes and streams, can become focal points, even the center of the development. An executive with American Forests says, "More and more home builders today view trees and other natural features as assets rather than obstacles in the development process.... They realize that protecting soils and saving and planting trees bolsters home values, improves sales, and enhances the developer's public image."[4] According to a survey by the National Association of Home Builders, "[u]pgraded, mature landscaping, which includes trees, ranked among the top five features desired in a newly built home."[5]

Even American Forests, the oldest citizen conservation group in the country, and the National Association of Home Builders (NAHB), have found common ground. Together they present the Global ReLeaf for New Communities award, which has as one of its goals "to promote and encourage an ecological standard of excellence in building tomorrow's communities that will preserve and establish trees and forests by joining leaders in the conservation movement with leaders in the building and land development trade." Promotional information from the NAHB makes the point that green property has become hot property:

> The presence of trees alone has been demonstrated to translate into a difference of between 2 and 17 percent additional sales value for the developer at selling time. Trees also tend to speed up sales of lots and homes.

sewer. Is it better to carve up five acres of forest than to temporarily disturb an acre of wetlands?

Usually regulations deal with problems as they arise, one by one, as if they exist in a vacuum. But this approach, relying on accretion rather than integration, is not ecological. The regulations may treat matters in isolation but nature does not. Tree preservation, for example, does much to prevent erosion, and to protect water quality and wildlife habitat, yet the regulations usually deal with these matters separately. Public sector planners need to step back and examine if environmental goals are being met even when a project bends certain rules. A more ecological approach to regulation, one that looks at the relationship of all the pieces, would prevent some of the defects in the present system. The code starts with the site and the lot and the streets and what is left over has to satisfy environmental needs. A better approach would plan for environmental features first, starting with an environmental suitability analysis, and

Well-Intentioned Regulations that Hurt the Environment and Slow Down Economic Development

1. **Zoning**. This is most important. Zoning needs to be flexible. For example, does it allow clustering and townhouses? Large lot zoning, intended to preserve the feeling of open country, often obliterates it; if 100 three acre lots are put on a 300 acre site, they will wipe out virtually all natural features. On the other hand, 100 half-acre lots clustered on a portion of the site--which residents are likely to enjoy just as much as three acre lots--preserve open space and require less digging and grading for roads and utilities.

2. **Roads**. Do roads have to be 36 feet wide? Can they be 24 feet? The wider they are, the more grading and tree cutting they require. Can cul-de-sacs be planted, or must a developer lay down a disk of heat-absorbing asphalt?

   Rules about parking lots are especially destructive and could be more flexible. Even on Christmas Eve, the nether reaches of a mall parking lot are empty enough to land a Boeing 747 and send a marching band out to meet it. Parking spaces should be provided just to meet customer flow data, and shared parking should be encouraged. Businesses with evening hours, such as movie theaters and restaurants, can share parking with adjacent day tenants, such as offices and stores. Lots that fill only rarely--such as fair grounds and arenas--could have grassy lots covered with trees, or some other permeable surface, rather than asphalt. (Perhaps a level of acceptable service can be established for parking lots, similar to that used for intersections. The size can be based on the percentage of time that the lot is expected to be full.)

3. **Road grades**. Although stabilization is a must, road grades should permit variation when feasible. A 3:1 slope alongside a 36 foot road often requires an 80- or 90 foot clearance. This gentler grade prevents erosion, but if a developer can create a 2:1 slope that offers the same result--and this is likely when original trees and shrubs remain undisturbed--why not use it? A 24 foot road width combined with a 2:1 slope can reduce tree clearance by one-third.

4. **Regulations that protect one natural feature without considering the total ecology**. Destroying a lot of one natural feature to save a little of another is bad policy. If sewers have to be routed around a wetland--probably the lowest point on the site and a good place for a gravity fed sewer--then one ends up building a lot more

Regulations are oftentimes done to prevent the worst offenders...There needs to be some way to allow the creative [developers and builders] to do the right kind of work.[1]

How the Current System of Regulation Can Discourage Environmentally Sensitive Design

The Climate Created by Regulation

Legislatures pass environmental controls because badly designed or poorly controlled development damages the land, pollutes the water, and wipes out wildlife. But regulation leads to design through restriction, with some developers doing just the minimum no matter how much they are badgered, while the innovators crash into bureaucratic road-blocks. Ironically, regulation can work against good environmental design by causing more headaches for good designers than for the uninspired.

A developer can protect sensitive areas by avoiding them completely. But avoidance does not really improve design in places that are developed. Second, by being off-limits, nature becomes something separate and isolated, even more irrelevant than it already is to our technology-driven life-styles and man-made environment. Why not encourage design that allows us to live in nature rather than apart from it?

Jurisdictions don't say to a developer, "Do the best job for the environment." They say, "Adhere to the restrictions for zoning, infrastructure, style, and the market. Now do the best job within these constraints. And you figure out the approval process." Sometimes innovative developers work within the constraints, sometimes they ask for variances. But the developer continually has to evaluate whether the value added through environmental protection is worth the cost and delay.

For example, a company owned a site that contained 1,200 acres, 180 of which were wetlands. Plans called for disturbing 3.5 acres, which required, at 2:1 mitigation, the creation of a 7 acre wetland elsewhere. To create that wetland, 7 acres of forest had to be cleared. According to tree regulations, new trees had to be planted in the new wetlands. The regulatory hoops through which this project had to leap included county tree preservation, state tree preservation, county wetlands, state wetlands, the Army Corps of Engineers, U.S. Fish and Wildlife, and the federal Environmental Protection Agency. Permit approval took two years. Coordination and overlap among regulatory agencies are important issues. Each regulatory agency has its own objectives, so obeying the rules of one does not necessarily help, and may even hurt, compliance with another. Also, following the rules will often erase the natural features of the site, while a more resourceful developer with a good design might have to argue at length against the rules.

ethic;

5. ***Conservation of resources, including a reduction in resource consumption, is practiced;***
6. ***To assure the achievement of paragraphs (1) through (5) of this subsection, economic growth is encouraged and regulatory mechanisms are streamlined; and***
7. ***Funding mechanisms are addressed to achieve these visions.***

Section 4.09 states that a local jurisdiction shall ensure that the implementation of the provisions above is "achieved through the adoption of applicable zoning ordinances and regulations, planned development ordinances and regulations, subdivision ordinances and regulations, and other land use ordinances and regulations that are consistent with the Plan."

Innovative developers who would protect the environment and build in growth areas do not find the regulations flexible. In fact, when an environmentally sensitive design varies from the letter of the regulations, a developer may spend time and money arguing for his or her plan. If the cost and delay are too great, the "by-the-book" project will prevail over innovation, even if it protects the environment less. Did the innovative project promote economic growth? Yes. Would it have protected the environment? Yes. Was it cost saving? Yes. Were development regulations flexible and streamlined enough to let the project move forward? No.

This Models and Guidelines report attempts to answer these questions: When can regulations be pliable enough to let design carry the weight of environmental protection? How can an official tell if an innovative design is sound enough to permit it quick passage through the approval process? This booklet provides examples of general techniques for protecting wetlands, steep slopes, forests, and wildlife habitats. Also, it looks at individual projects, mostly in Maryland, for both design elements and for how the innovations were handled by the regulatory process. Most of the residential developments described here have high densities. Well designed sprawl, after all, is still sprawl; density, then, protects the environment too, and complements good design.

Finally, this report will give examples of streamlined and flexible regulatory language.

INTRODUCTION

Planning advances along many fronts at once. But what happens when these fronts intersect? Advance forward long enough along one front and you will be pushing another one back. The tension between competing planning goals can be seen in the Economic Growth, Resource Protection, and Planning Act. Can a jurisdiction move forward on economic growth and resource protection without one triumphing at the expense of the other? Yes. Before these Models and Guidelines describe how, let us look at the provisions of the Planning Act that set up the challenge of reconciling competing planning goals.

Section 3.05 (a)(1)(vi) of Article 66B of the Annotated Code of Maryland says that a jurisdiction's plan shall contain an element which

> ...***encourages the following:***
>
> 1. ***Streamlined review of applications for development, including permit review and subdivision plat review within the areas designated for growth in the Plan;***
> 2. ***The use of flexible development regulations to promote innovative and cost-saving site design and protect the environment; and***
> 3. ***Economic development in areas designated for growth in the plan through the use of innovative techniques[.]***

§3.05(a)(1)(viii) requires

A sensitive area element that contains goals, objectives, principles, policies, and standards designed to protect, from the adverse effects of development, sensitive areas, including the following:

1. ***Streams and their buffers;***
2. ***100-year floodplains;***
3. ***Habitats of threatened and endangered species; and***
4. ***Steep slopes.***

§3.06(b) lists the seven visions that a local plan must implement:

1. ***Development is concentrated in suitable areas;***
2. ***Sensitive areas are protected;***
3. ***In rural areas, growth is directed to existing population centers and resource areas are protected;***
4. ***Stewardship of the Chesapeake Bay and the land is a universal***

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I returned to my home for the first unhurried, nostalgic rediscover of this land in over a decade. Nearest were the Black Woods, only a few square miles in area but of great richness --some low hills covered by forest, the burn, marshes with a native orchid, fields of buttercups, rock outcrops, some gorse, broom and heather, Scots Pine and larch, copses of beech edged with rowan and birch, thorns and laburnum, chest-high bracken. The burn had familiar stepping stones, overhangs where small trout and red-breasted minnows lived, shaded by reeds, osiers and willows. Whitewashed stone farm-houses sat squarely with their outbuildings and old trees marking the ridges.

Larks nested in the meadow, curlew in the plough, weasels, stoats and badgers lived in the hedgerows; there were red foxes, red squirrels and hedgehogs, grouse flew from heather underfoot. It was a myriad place....

I came expecting to see it shrunken, for this is the lot of the place revisited, but not to find it obliterated. Yet the City...had annexed this land and made it its own. Each hill had been bulldozed to fill a valley, the burn was buried in culverts, trees had been felled, farmhouses and smithy were demolished, every tree, shrub, marsh, rock, fern and orchid, every single vestige of that which had been, was gone....

Now housing was urgently required and this was a fine place to build; some small perception, a minimal intelligence, a leavening of art could have made it enchanting. The place was complex, but it was made uniform. It had contained many delights, but these were obliterated. It has represented much that people had come far to seek, but this satisfaction to the spirit was denied to those who needed it most.

Ian L. McHarg, *Design with Nature*