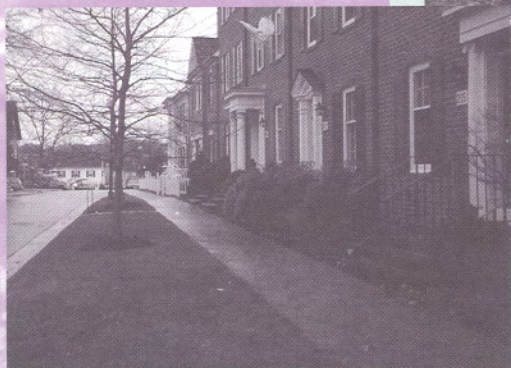


April 1998

Prepared by the SITE PLANNING ROUNDTABLE



## Consensus Agreement On Model Development Principles To Protect Our *Streams, Lakes,* And *Wetlands*

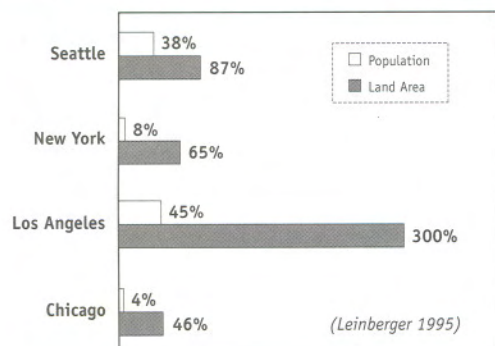




## Introduction

More than 1.5 million acres of land are developed each year in the United States. In most communities, this development consists of many individual projects built over decades. The cumulative amount of land development can transform the landscape within a community. Development alters the surface of the land, by replacing natural cover with roof tops, roads, parking lots, driveways and sidewalks. These hard surfaces are impermeable to rainfall and are collectively known as impervious cover.

**EXPANSION IN POPULATION AND LAND (1970-1990)**



Recent watershed research has shown that impervious cover can have a negative impact on the quality of our nation's aquatic resources. The influence of impervious cover on aquatic systems presents a challenge to communities interested in sustainable development.

Communities have long struggled to achieve the goal of sustainable development — economic growth that also protects the local environment. Indeed, many communities have found that their own development codes and standards can actually work against sustainable development. For example, local codes and standards often create needless impervious cover in the form of wide streets, expansive parking lots and large-lot subdivisions. At the same time, local codes often give developers little or no incentive to conserve natural areas that are so important for watershed protection. Consequently, communities may want to reevaluate their local codes to ensure that they produce more sustainable development.

---

***Conventional, low-density residential development consumes twice as much land as more compact, open space development. (CBF, 1996)***

---

As members of the Site Planning Roundtable, we have worked for two years to craft model principles to guide better land development. We are a wide and diverse group of individuals involved in planning, designing and building new communities and protecting the natural environment. It is our contention that better development can only be achieved if we fundamentally change the way that land is developed— by reducing impervious cover, conserving natural areas and preventing stormwater pollution.

To this end, we have brought our technical and real world experience together through a consensus process in an effort to create more environmentally sensitive, economically viable and locally appropriate development. We have developed a set of twenty-two model development principles for consideration by local planners, developers, lenders and environmental groups. Applied together, the model principles can measurably reduce impervious cover, conserve natural areas and prevent stormwater pollution from new development. In addition, the model principles can enhance the value of our neighborhoods and enrich the quality of life in our communities. With this in mind, the model principles should be considered as a starting point when evaluating current local codes, and should be interpreted in the context of the technical support document upon which they were derived. This technical support document is entitled, "Better Site Design: A Handbook for Changing Development Rules in Your Community."

---

***Impervious cover levels greater than 10% have been shown to negatively impact the quality of fish habitat and wetlands. (Booth 1991, Taylor 1993)***

---





## Key Points of Consensus

- 1 Meaningful changes in how development occurs can only happen when local concerns regarding safety, fire protection, liability, economics, market acceptance, and quality of life are thoroughly satisfied.
- 2 Model development principles are needed to guide better land development and to act as a benchmark to assess current zoning, parking, street and subdivision codes.
- 3 Model development principles must also enhance the quality of life within a community as well as protect natural and aquatic resources.
- 4 Model development principles must be implemented as part of a flexible, locally-adapted strategy for better site planning and are not a national "one-size fits all" standard.
- 5 The model development principles should be consistent with larger community goals (both economic and environmental) that are put forth in comprehensive growth management, resource protection, or watershed management plans.
- 6 Where possible, infill and redevelopment should be encouraged to reduce the amount of new impervious cover created in the landscape and create a more compact development pattern.
- 7 It is recognized that the model principles must be adapted to reflect the unique characteristics of each community, not all principles apply to every development site, and some principles may not always fully complement each other.

To this end, we have combined our technical, professional, and real world experiences to craft twenty-two model development principles that identify, for local planners and zoning officials, key benchmarks for measurably reducing the amount of impervious cover created by new development.

## Benefits of Applying the Model Development Principles

***The model land development principles have been documented to benefit both the natural environment and the community. Some communities have realized the following benefits:***

- ② protects the quality of local streams, lakes and estuaries
- ② generates smaller loads of stormwater pollutants
- ② helps reduce soil erosion during construction
- ② reduces development costs
- ② increases local property values
- ② creates more pedestrian friendly neighborhoods
- ② provides open space for recreation
- ② protects sensitive forests, wetlands and habitats from clearing
- ② results in a more attractive landscape
- ② reduces car speeds on residential streets
- ② allows for more sensible locations for stormwater facilities
- ② increases local property tax revenues
- ② makes compliance with wetland and other regulations easier
- ② promotes neighborhood designs that provide a sense of community
- ② provides urban wildlife habitat through natural area preservation



## Site Planning Roundtable

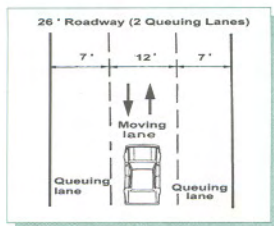
### Model Development Principles

The twenty-two model development principles provide design guidance for economically viable, yet environmentally sensitive development. Our objective is to provide planners, developers, and local officials with benchmarks to investigate where existing ordinances may be modified to reduce impervious cover, conserve natural areas, and prevent stormwater pollution. These development principles are not national design standards. Instead, they identify areas where existing codes and standards can be changed to better protect streams, lakes and wetlands at the local level.

The development principles are divided into the three following areas:

- ⊕ Residential Streets and Parking Lots (Habitat for Cars)
- ⊕ Lot Development (Habitat for People)
- ⊕ Conservation of Natural Areas (Habitat for Nature)

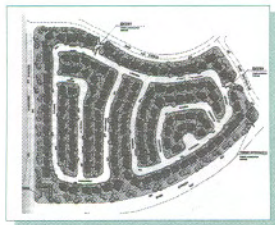
Each principle is presented as a simplified design objective. Actual techniques for achieving the principle should be based on local conditions. Please consult the technical support document, "Better Site Design: A Handbook for Changing Development Rules in Your Community" for more detailed rationale for each principle.



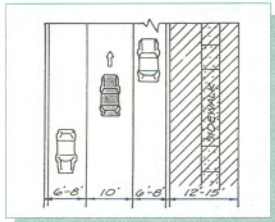
## Residential Streets and Parking Lots

### (Habitat for Cars)

1. Design residential streets for the minimum required pavement width needed to support travel lanes; on-street parking; and emergency, maintenance, and service vehicle access. These widths should be based on traffic volume.



(Source: ULI, 1992)



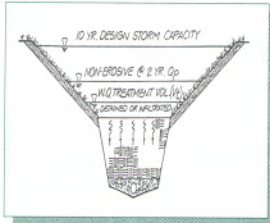
2. Reduce the total length of residential streets by examining alternative street layouts to determine the best option for increasing the number of homes per unit length.

3. Wherever possible, residential street right-of-way widths should reflect the minimum required to accommodate the travel-way, the sidewalk, and vegetated open channels. Utilities and storm drains should be located within the pavement section of the right-of-way wherever feasible.



4. Minimize the number of residential street cul-de-sacs and incorporate landscaped areas to reduce their impervious cover. The radius of cul-de-sacs should be the minimum required to accommodate emergency and maintenance vehicles. Alternative turnarounds should be considered.

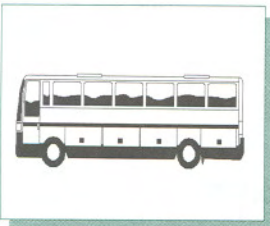




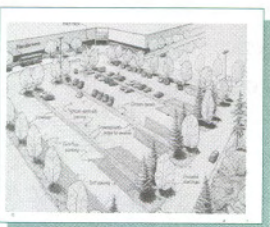
5. Where density, topography, soils, and slope permit, vegetated open channels should be used in the street right-of-way to convey and treat stormwater runoff.



6. The required parking ratio governing a particular land use or activity should be enforced as both a maximum and a minimum in order to curb excess parking space construction. Existing parking ratios should be reviewed for conformance taking into account local and national experience to see if lower ratios are warranted and feasible.

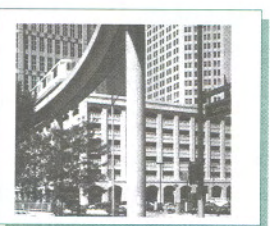


7. Parking codes should be revised to lower parking requirements where mass transit is available or enforceable shared parking arrangements are made.



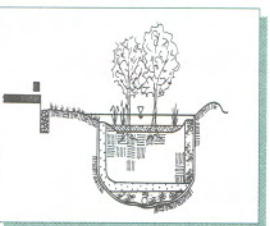
8. Reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in the spillover parking areas.

(Source: Wells, 1995)



9. Provide meaningful incentives to encourage structured and shared parking to make it more economically viable.

(Source: ULI, 1997)

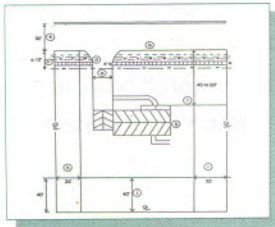


10. Wherever possible, provide stormwater treatment for parking lot runoff using bioretention areas, filter strips, and/or other practices that can be integrated into required landscaping areas and traffic islands.

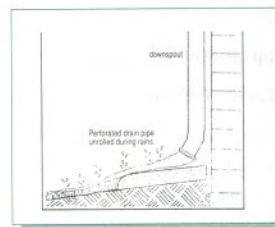
## Lot Development (Habitat for People)



(Photo Courtesy of Randall Arendt)



(Source: Arendt, 1994)



11. Advocate open space development that incorporates smaller lot sizes to minimize total impervious area, reduce total construction costs, conserve natural areas, provide community recreational space, and promote watershed protection.

12. Relax side yard setbacks and allow narrower frontages to reduce total road length in the community and overall site imperviousness. Relax front setback requirements to minimize driveway lengths and reduce overall lot imperviousness.

13. Promote more flexible design standards for residential subdivision sidewalks. Where practical, consider locating sidewalks on only one side of the street and providing common walkways linking pedestrian areas.

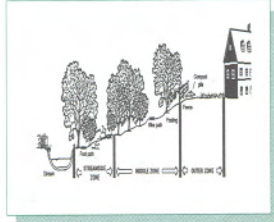
14. Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together.

15. Clearly specify how community open space will be managed and designate a sustainable legal entity responsible for managing both natural and recreational open space.

16. Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas and avoid routing rooftop runoff to the roadway and the stormwater conveyance system.



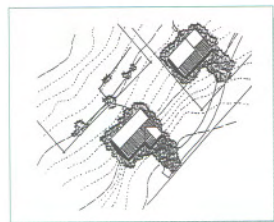
## Conservation of Natural Areas (Habitat for Nature)



17. Create a variable width, naturally vegetated buffer system along all perennial streams that also encompasses critical environmental features such as the 100-year floodplain, steep slopes and freshwater wetlands.



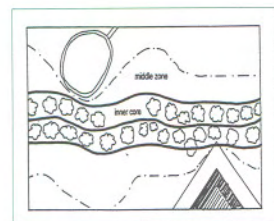
18. The riparian stream buffer should be preserved or restored with native vegetation that can be maintained throughout the plan review, delineation, construction, and occupancy stages of development.



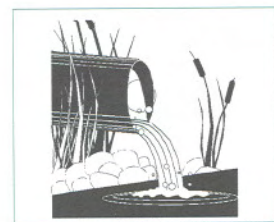
19. Clearing and grading of forests and native vegetation at a site should be limited to the minimum amount needed to build lots, allow access, and provide fire protection. A fixed portion of any community open space should be managed as protected green space in a consolidated manner.



20. Conserve trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native plants. Wherever practical, manage community open space, street rights-of-way, parking lot islands, and other landscaped areas to promote natural vegetation.



21. Incentives and flexibility in the form of density compensation, buffer averaging, property tax reduction, stormwater credits, and by-right open space development should be encouraged to promote conservation of stream buffers, forests, meadows, and other areas of environmental value. In addition, off-site mitigation consistent with locally adopted watershed plans should be encouraged.



22. New stormwater outfalls should not discharge unmanaged stormwater into jurisdictional wetlands, sole-source aquifers, or other water bodies.



## Recommendations

- ⊕ We affirm our support for the model development principles and the technical support document, "Better Site Design," upon which they are based.
- ⊕ We encourage local governments to consider these principles when evaluating their local zoning codes, subdivision ordinances, and landscape ordinances.
- ⊕ We encourage the development community to incorporate these model development principles in their land development projects.
- ⊕ We encourage the formation of local roundtables to adopt and adapt these model development principles within the context of local growth and environmental protection goals.
- ⊕ We encourage the lending and insurance communities to consider these principles and examine their role in land development.
- ⊕ We encourage local, state, and federal agencies to provide the technical support, financial incentive, and regulatory flexibility needed to promote the model development principles.
- ⊕ We encourage environmental and watershed organizations and the general public to use these principles as educational tools.

## Acknowledgement

This Consensus Agreement and the accompanying model development principles were crafted in conjunction with the diverse cross-section of development, local government, and environmental professionals that participated in the Site Planning Roundtable. Members of the Site Planning Roundtable provided the technical and real-world experience needed to craft and refine the model development principles. Recommendations of the Site Planning Roundtable reflect our professional and personal experience with land development and do not necessarily carry the endorsement of the organizations and agencies represented by its members.

## Site Planning Roundtable Members

**Ken F. Kobetsky, PE** American Association of State Highway Transportation Officials

**Cheryl Kollin, ASLA, ISA** American Forest Association

**Christopher J. Gribbs, Assoc. AIA** American Institute of Architects

**Jeffrey Soule, AICP** American Planning Association

**Sarah L. Layton** American Public Works Association

**Tina Yin** American Rivers

**Kyle Schilling, PE, DEE** American Society of Civil Engineers

**J. William Thompson, ASLA** American Society of Landscape Architects

**Menchu Martinez** Chesapeake Bay Program

**Nancy Jacobsen** Community Associations Institute

**Edward T. McMahon, JD** The Conservation Fund

**Bruce G. Douglas, AICP** Office of Comprehensive Planning, County of Fairfax, VA

**Joseph H. Necker, Jr., PE** Howard Research & Development Corporation, an affiliate of the Rouse Company

**Lisa M. Fontana** Institute of Transportation Engineers

**Kendra J. Briechele** International City/County Management Association

**Barbara Yuhas** International City/County Management Association

**Andrew Zepp** Land Trust Alliance

**Steven Z. Kaufman, JJD** Linowes & Blocher

**Douglas E. Lohmeyer, PE** Loiederman Associates, Inc.

**Dean D. Dubbe, PE** Michael T. Rose Company

**Derick P. Berlage, Councilmember** Montgomery County Council

**Donald L. Woodsmall, Esq.** Natelli Communities

**Robert McNamara, AICP** National Association of Home Builders

**Roger Platt** National Realty Committee

**Diane Cameron and Peter Lehner** Natural Resource Defense Council

**Larry S. Coffman** Prince Georges County, Department of Environmental Resources

**J. Glenn Eugster and Jamal Kadri** U.S. EPA Office of Sustainable Ecosystems & Communities

**John L. Cochran** U.S. Fire Administration

**Michael Pawlukiewicz** Urban Land Institute

**Lowell W. Adams, PhD** Urban Wildlife Resources



## Acknowledgements

The Site Planning Roundtable would not have been possible without the generous support of our funders.

- ☉ The Morris and Gwendolyn Cafritz Foundation
- ☉ US EPA Office of Wetlands, Oceans, and Watersheds
- ☉ Chesapeake Bay Trust
- ☉ Turner Foundation
- ☉ Chesapeake Bay Program

We would also like to thank the individuals who served as chairs of the Research Subgroups:

Lisa Fontana—Institute of Transportation Engineers

### **Residential Streets and Parking Lots**

Roger Platt—National Realty Committee

### **Conservation of Natural Areas**

Richard Claytor—Center for Watershed Protection

### **Lot Development**

CWP Site Planning Roundtable Team Members Chris Swann, Jennifer Zielinski, Deb Caraco, and Hye Yeong Kwon.

## References

**Arendt, R. 1994.** Designing Open Space Subdivisions. National Lands Trust. Media, PA.

**Booth, D. 1991.** Urbanization and the natural drainage system—impacts, solutions and prognoses. Northwest Environmental Journal. 7(1):93-118.

**Chesapeake Bay Foundation. 1996.** Growth, Sprawl, and the Bay: Simple Facts About Growth and Land Use. Chesapeake Bay Foundation. Annapolis, MD.

**Leinberger, C. 1995.** "Metropolitan Development Trends of the Late 1990s: Social and Environmental Implications." In Land Use in America, H.L. Diamond and P.F. Noonan, 1996, editors. Island Press. Washington, DC.

**Taylor, B.L. 1993.** The influences of wetland and watershed morphological characteristics and relationships to wetland vegetation communities. Masters thesis. Dept. of Civil Engineering. University of Washington. Seattle, WA.

**Urban Land Institute. 1992.** Density by Design. Urban Land Institute. Washington, DC.

**Urban Land Institute. 1997.** America's Real Estate. Urban Land Institute. Washington, DC.

**Wells, C. 1995.** Impervious Surface Reduction Study: Final Report. City of Olympia Public Works Department. Water Resources Program. Olympia, WA.

## The Center for Watershed Protection

The Center for Watershed Protection is dedicated to finding new, cooperative ways of protecting and restoring our nation's watersheds. Our mission is to:

- ☉ Understand and define the relationship between urban growth and the degradation of watersheds;
- ☉ Link specific land uses to water quality;
- ☉ Educate public and private sectors about the need for greater protection of our waters; and
- ☉ Advise communities on the most reliable and effective ways to protect and restore urban watersheds;
- ☉ Bring together new approaches to watershed management by promoting professional dialog.

Located in Ellicott City, MD, the Center is a 501 (c)(3) nonprofit corporation dedicated to the protection and restoration of our nation's streams, rivers and estuaries through research, education and improved watershed management. As a national organization, the Center is closely tied with the communities around the country involved in urban watershed protection and restoration. Since its inception, the Center has provided technical assistance to local governments in more than thirty states. This close contact enables the Center to understand the unique needs and concerns of local and state governments in the emerging area of environmental practice.



## Resources - Books and Publications

the following practical manuals provide guidance on better site planning techniques

- **Best Development Practices: Doing the Right Thing and Making Money at the Same Time.**  
Ewing, R. American Planning Association, Chicago, IL. 1996.
- **Building Greener Neighborhoods: Trees as Part of the Plan.**  
Petit, J., et al. Published by American Forests and NAHB. 1995.
- **Conservation Design for Storm Water Management.**  
Delaware Department of Natural Resources and Environmental Control Dover, DE 1997
- **The Conservation Easement Handbook.**  
James Diehl and Thomas S. Barrett. Published by Trust for Public Land and Land Trust Alliance with the Public Resource Foundation. 1988.
- **Designing Open Space Subdivisions.**  
Randall Arendt. Published by Natural Lands Trust. 1994.
- **Density by Design.**  
James W. Wentling and Lloyd W. Bookout, editors. Published by Urban Land Institute. 1992.
- **Flexible Parking Requirements.**  
Thomas P. Smith. Published by American Planning Association. Report Number 377.
- **Flexible Zoning: How it Works.**  
Douglas R. Porter, Patrick L. Phillips, and Terry J. Lassar. Published by Urban Land Institute. 1988.
- **Impervious Cover Reduction Study: Final Report.**  
Cedar Wells. City of Olympia Public Works Department. Water Resources Program. Olympia, WA. 1995.
- **Land Development Handbook: Planning, Engineering and Surveying.**  
Dewberry and Davis. McGraw-Hill, New York, NY. 1996.
- **Low-Impact Development Design Manual.**  
Larry Coffman. Published by the Department of Environmental Resources, Prince Georges County, Maryland. 1997.
- **A Policy on Geometric Design of Highways and Streets.**  
American Association of State Highway and Transportation Officials (AASHTO). Washington, DC. No. 33. 1994.
- **Rural by Design.**  
Randall Arendt. Published by the American Planning Association. 1994.
- **Site Planning for Urban Stream Protection.**  
Tom Schueler. Published by the Center for Watershed Protection. 1995.
- **Start at the Source: Residential Site Planning and Design Guidance Manual for Stormwater Quality Protection.**  
Bay Area Stormwater Management Agencies Association (BASMAA). San Francisco, CA. January 1997.
- **The Wild Lawn Handbook: Alternatives to the Traditional Front Lawn.**  
Stevie Daniels. Macmillan Press, New York, NY. 1995.

## Resources On-Line

- **American Association of Landscape Architects**  
[www.asla.org](http://www.asla.org)
- **American Association of State Highway Transportation Officials** [www.aashto.org](http://www.aashto.org)
- **American Forests** [www.amfor.org](http://www.amfor.org)
- **American Institute of Architects**  
[www.aiaonline.com](http://www.aiaonline.com)
- **American Planning Association and American Institute of Certified Planners** [www.planning.org](http://www.planning.org)
- **American Public Works Association**  
[www.pubworks.org](http://www.pubworks.org)
- **American Rivers**  
[www.amrivers.org](http://www.amrivers.org)
- **Center for Rural Massachusetts**  
[www-unix.oit.umass.edu/ruralma/CRM.html](http://www-unix.oit.umass.edu/ruralma/CRM.html)
- **Center for Watershed Protection, Inc.**  
[www.cwp.org](http://www.cwp.org)
- **Chesapeake Bay Program**  
[www.chesapeakebay.net/bayprogram/](http://www.chesapeakebay.net/bayprogram/)
- **Community Associations Institute**  
[www.caionline.org](http://www.caionline.org)
- **Conservation Fund**  
[www.conservationfund.org](http://www.conservationfund.org)
- **Institute of Transportation Engineers**  
[www.ite.org](http://www.ite.org)
- **Lincoln Institute of Land Policy**  
[www.lincolninstitute.edu](http://www.lincolninstitute.edu)
- **National Association of Home Builders**  
[www.nahb.org](http://www.nahb.org); [www.nahb.com](http://www.nahb.com)
- **Natural Resource Defense Council**  
[www.nrdc.org](http://www.nrdc.org)
- **Planning Commissioners Journal**  
[www.plannersweb.com](http://www.plannersweb.com)
- **Smart Growth Network** [www.smartgrowth.org](http://www.smartgrowth.org)
- **Urban Land Institute** [www.uli.org](http://www.uli.org)

## How to Get Copies of the Consensus Agreement and Better Site Design: A Handbook for Changing Development Rules in Your Community

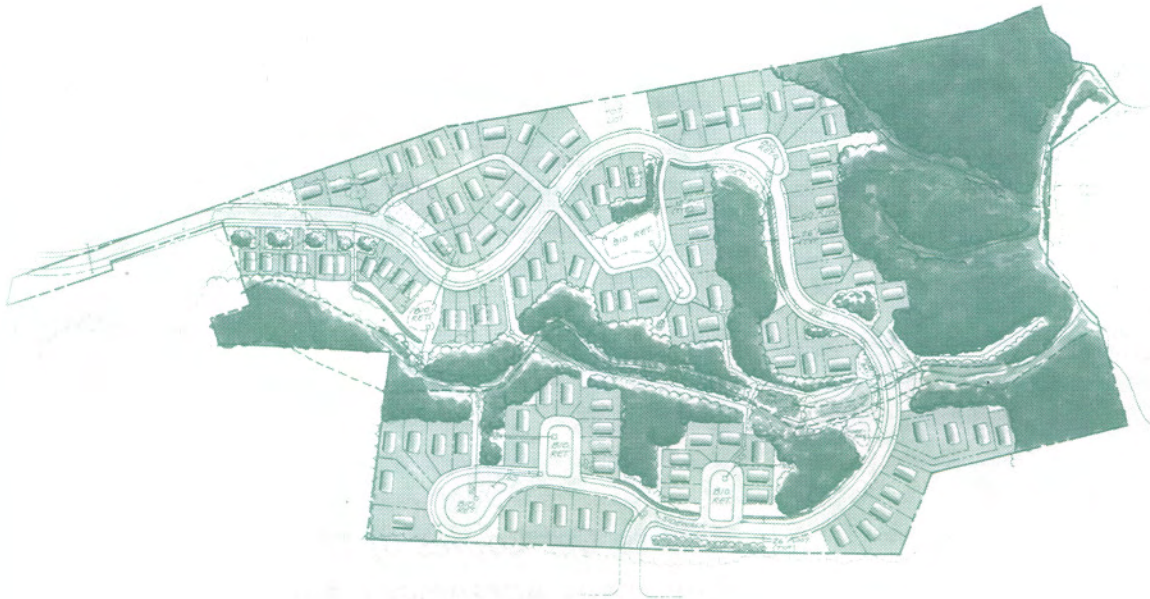
Additional copies of the Consensus Agreement and Better Site Design can be requested from:

Center for Watershed Protection, Inc.  
8391 Main Street  
Ellicott City, Maryland 21043  
Phone: 410-461-8323  
Fax: 410-461-8324  
Email: [mrrunoff@pipeline.com](mailto:mrrunoff@pipeline.com)  
Website: [www.cwp.org](http://www.cwp.org)

The Consensus Agreement is \$3.00.  
Better Site Design is \$35.00.

For multiple copies of either document,  
please contact the Center.





---

*Careful application of the model development principles can sharply reduce the impervious cover created by new development, and protect streams, forests, and wetlands. In this design, stormwater pollutant loading was reduced by over 40% and the cost of development was reduced by approximately 20%.*

---

*This document is printed on 100% post-consumer recycled paper.*

