Photo Credit: Patrick Varga

CARROLL COUNTY

RECOMMENDED MODEL DEVELOPMENT PRINCIPLES

for Carroll County, Maryland
Consensus of the Builders for the Bay Site Planning Roundtable

FUNDED IN PART BY:
Carroll County, MD
Chesapeake Bay Trust
Constellation Energy

AN INITIATIVE OF THE *BUILDERS FOR THE BAY*:
Center for Watershed Protection, Inc.
Alliance for the Chesapeake Bay
Home Builders Association of Maryland

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- Carroll County, MD
- Chesapeake Bay Trust
- Constellation Energy

We would also like to thank the individuals who served as subcommittee spokespersons:

- Chris Batten: Lot Development Subcommittee
- Kimberly Golden Brandt: Residential Streets and Parking Lots Subcommittee
- Keith Heindel: Natural Resource Management Subcommittee
- John Lopez: Stormwater Management Subcommittee

Finally, we also want to thank the Westminster Senior Center for the use of their facilities.

Team members included Julie Tasillo, Paul Sturm and Mike Novotney from the Center for Watershed Protection and Lou Etgen with the Alliance for the Chesapeake Bay.

Copies of this document are available from the Carroll County Bureau of Resource Management (http://ccgovernment.carr.org/ccg/resmgmt) or the Center for Watershed Protection (www.cwp.org).

Letter of Introduction

Just under a year ago, a partnership of the Carroll County Government, the Alliance for the Chesapeake Bay, and the Center for Watershed Protection initiated a process known as Builders for the Bay to systematically examine Carroll County's local codes and ordinances with an eye toward promoting more environmentally-sensitive and economically viable development. This process is a collaborative initiative designed to pull together local government agencies, the development community, neighborhood organizations, engineering and planning firms, and environmental and conservation groups to come to consensus on changes to ensure clean drinking water, lakes, rivers and streams.

Throughout the past year, participants have reviewed current development practices involving four major categories: 1) Residential Streets and Parking Lots, 2) Lot Development, 3) Natural Resource Management, and 4) Stormwater Management. In addition, several regulatory drivers were considered including the Antidegradation Policy, National Pollutant Discharge Elimination System, Reservoir Watershed Management Agreement of 2005, Stormwater Management Act of 2007, Total Maximum Daily Loads and the Water Resources Element Law. From this review, participants prepared this consensus document, which contains a variety of recommendations and action items. These actions will require follow through from partners to see that the recommendations of the consensus document are implemented to successfully improve protection of Carroll County's natural resources and quality of life.

Acknowledging a long history of thoughtful management of natural resources in Carroll County, Builders for the Bay has been embraced by the County Commissioners and partners. The consensus process positions the county to further enhance quality of life, economic growth, and protection of vital resources. On behalf of the Builders for the Bay partners, we are pleased to convey this document to the citizens of Carroll County and to seek their support in the implementation of these recommendations.

Very truly yours,

Julia W. Gouge
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Purpose

This document presents specific recommendations for fostering more environmentally-sensitive site development in Carroll County. These recommendations were crafted by a diverse cross-section of local government, civic, environmental, homebuilding, and other community professionals that participated in the Carroll County Site Planning Roundtable initiated by the Builders for the Bay program.

Introduction and Background

Every year, over two million acres of land are altered as part of the development process in the United States. Development has historically led to degradation in water quality and biological integrity (NRCS, 2001). The impacts of watershed urbanization on the water quality, biology and physical conditions of aquatic systems have been well documented (CWP, 2003). As such, local codes and ordinances that promote reduced impact of development on local water resources are critical to future sustainability.

Protecting water resources and the character of the local landscape while allowing growth and promoting redevelopment requires local governments, developers and site designers to fundamentally change current development practices. Deciding where to allow or encourage development and protect natural resources is a difficult issue that jurisdictions have to balance. While effective zoning and comprehensive planning are critical to protecting water resources, communities also have to explore measures to minimize the impact of impervious cover, maintain natural hydrology, and preserve contiguous open space on sites where development is to occur.

Toward this end, the Center for Watershed Protection, in concert with the Alliance for the Chesapeake Bay, the Home Builders Association of Maryland, and the Carroll County Department of Planning, convened a local Site Planning Roundtable in Carroll County.

The local Roundtable process in Carroll County was modeled after the National Site Planning Roundtable (CWP, 1998a), the 22 Model Development Principles (CWP, 1998b) and four basic objectives:

1. Reduce overall site impervious cover
2. Preserve and enhance existing natural resources
3. Integrate stormwater management
4. Retain a marketable product

The Model Development Principles act as benchmarks upon which more specific code and ordinance recommendations were adapted for Carroll County. The benefits of applying these Model Development Principles are summarized in the table on the following page.

Benefits of Applying the Model Development Principles

Local Government:
- Improves quality of life for residents
- Facilitates compliance with wetlands and other regulations
- Assists with compliance of Water Resources Element, Stormwater Act of 2007, TMDLs, NPDES, etc.
- Increases local property tax revenues due to higher home values

Homeowners:
- Increases property values
- Creates more pedestrian friendly neighborhoods
- Provides open space for recreation
- Results in a more attractive landscape
- Reduces car speed on residential streets
- Promotes neighborhood designs that provide a sense of community

Developers:
- Reduces development costs
- Provides flexibility in design options
- Allows for more sensible locations for stormwater facilities
- Facilitates compliance with wetlands and other regulations

Environment:
- Protects sensitive forests, wetlands, and wildlife habitats from clearing
- Protects the quality of local streams, lakes and estuaries
- Generates reduced loads of stormwater pollutants
- Helps reduce soil erosion during construction

Why Carroll County?

The Carroll County Site Planning Roundtable is the seventh Builders for the Bay roundtable located in the Chesapeake Bay watershed. The purpose of the roundtable was to adapt the principles developed at the national level for local application and to identify local codes and ordinances that act to prohibit Better Site Design through a consensus building process. The Carroll County roundtable was initiated for several reasons:

Roundtable participants and Carroll County Commissioners celebrate the final consensus document

- Carroll County is within the Chesapeake Bay Watershed.
- Carroll County is experiencing strong development pressures. From 1990 to 2000, the number of housing units increased by 24.2% (U.S. Census, 2000)
- Significant growth is expected to continue and households are expected to increase by 61% before 2030 (U.S. Census, 2000)
- As new regulations are enacted, the County is proactively encouraging environmentally sensitive development to minimize impacts to drinking water supplies and already impaired streams
- The County made a commitment to this process in the Baltimore Reservoir Watershed Management Agreement 2005 Action Strategy
- County officials expressed an interest and were willing to commit staff and resources to the process

The Carroll County Roundtable Process

Carroll County Roundtable members convened many times over an 8-month period to become familiar with the Model Development Principles, review existing codes and regulations, and reach group consensus on a final set of recommendations. The Roundtable consisted of over 36 dedicated members representing a wide range of professional backgrounds and experience related to local development issues. The process included the following steps:

Detailed Codes Analysis: June – August 2007

The codes analysis was based on results from the Codes and Ordinances Worksheet (COW), in-depth review of existing codes; ordinances, policies and regulations; interviews conducted with local engineers, developers and County staff. The COW asks a series of questions organized around the Model Development Principles, which are scored based on national benchmarks for Better Site Design (BSD). This analysis completed by the Roundtable facilitators provided a concise summary of the regulatory barriers to implementing environmentally-sensitive site design in the County and served as the foundation for subcommittee discussions. More than 15 documents were reviewed as part of the codes analysis, with a primary focus on the following County documents:

- Code of Public Laws and Ordinances
- Design Manual, Volume 1: Roads and Storm Drains
- Development Review Manual
- Landscaping Manual
- Supplement to the Maryland Stormwater Design Manual
- Water Resource Management Manual

The results of this review revealed that the County has an existing set of strong development standards. In particular, the natural resource protection and stormwater management programs are some of the best in the state. These programs include strong stream buffer and tree protection as well as requiring all new homes to disconnect their rooftops. In addition, the County's dedicated staff started to address environmentally-friendly regulations even before the Roundtable process began. For example, the County convened a workgroup to revise existing parking standards and had a strong set of existing road standards.

Carroll County Roundtable participants at the Kickoff Meeting

Kick-off Meeting: September 2007

Approximately 36 stakeholders from the County participated in the meeting. Almost every major stakeholder group was represented including the development community, local government, and environmental groups. The kickoff meeting familiarized roundtable members with the Model Development Principles, the Roundtable process, and presented the results of the Carroll County code review.

Subcommittee Meetings and Consensus Building: September 2007 – January 2008

The full roundtable was divided into four subcommittees with a diversity of interests and expertise represented in each. Each subcommittee was responsible for reaching consensus on a subset of the Model Development Principles:

- Residential Streets and Parking Lots
- Lot Development
- Natural Resource Management
- Stormwater Management

Consensus on Final Recommendations: February 2008

The Roundtable came to consensus on the full set of recommendations. The full Roundtable met again in April 2008 to discuss an implementation plan.

Summary of Regulations and Agreements

Introduction

The recommendations that are presented in this document are primarily intended to reduce impervious cover, help manage stormwater and conserve natural areas throughout Carroll County. An additional benefit of these recommendations is that they help address state and federal regulations and agreements. These include:

- Antidegradation Policy
- National Pollutant Discharge Elimination System (NPDES)
- Reservoir Watershed Management Agreement of 2005
- Stormwater Management Act of 2007 (HB 786)
- Total Maximum Daily Loads
- Water Resources Element Law (HB 1141)

Table 2 provides a matrix that shows how each recommendation helps comply with one or more of the regulations and agreements. A description of each regulation and agreement follows. While each recommendation helps improve water quality the specific way it occurs is illustrated in one of three ways;


Minimize creation of future impervious cover


Treat existing impervious cover


Conservation of natural areas

Antidegradation Policy

One element of the federal water quality standards is a required Antidegradation policy to protect waters at three tiers of quality, as follows: Tier 1 meets existing minimum designated uses. Tier 2 maintains high quality where it is better than the minimum requirement. Tier 3 maintains outstanding waters with special or sensitive aquatic life that may not yet be impacted. Maryland currently does not have any waters designated for Tier 3.

In June 2004, the State adopted approximately 85 non-tidal stream segments as Tier 2 waters based on high Maryland Biological Stream Survey scores. Tier 2 specifies an existing high quality water that is better than the minimum needed to support "fishable-swimmable" uses. While water quality can be slightly impacted, the State Antidegradation policy identifies procedures that must be followed before a new or expanded discharge can be permitted to a Tier 2 water. They are:

- Can the discharge be avoided or placed elsewhere? If so, that should be done.
- If the discharge is necessary, has everything been done to minimize the water quality impact?
- If the impact has been minimized to the greatest extent feasible, but an impact to water quality will still occur, a social and economic justification for that impact must be prepared and approved by Maryland Department of the Environment (MDE) before the discharge can be permitted (MDE, 2005).

More information on Maryland's Antidegradation Policy is available through MDE's TMDL Implementation Guidance for Local Governments which can be found at: http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/TMDL_implementation_2006_guidance_document.asp

National Pollution Discharge Elimination System Program (NPDES)

Phase I

Under its NPDES regulatory program, the Clean Water Act makes it illegal to discharge pollutants from a point source to the waters of the U.S without a permit. The NPDES Stormwater Phase I Rule established stormwater discharge control requirements for 11 categories of industrial activity and for municipal separate storm sewer systems (MS4s) serving populations of 100,000 or greater. These regulated MS4s must obtain an NPDES permit and develop a stormwater management program to prevent harmful pollutants from entering the MS4 and being discharged into local waterbodies. In Maryland, 10 jurisdictions and the State Highway Administration are covered under the Phase I program (Table 1). In Carroll County, the incorporated municipalities are included under the counties NPDES permit through the County-Town agreement. For more information on NPDES permit requirements in Maryland, see: http://www.mde.state.md.us/Programs/WaterPRograms/SedimentandStormwater

Table 1. Maryland MS4 Phase I Communities

- Maryland State Highway Administration
- Anne Arundel County
- Baltimore City
- Baltimore County
- Carroll County
- Charles County
- Frederick County
- Harford County
- Howard County
- Montgomery County
- Prince George's County

Reservoir Watershed Management Agreement of 2005

The Reservoir Watershed Management Agreement is an agreement between Baltimore City, Carroll County, MDE, Maryland Department of Agriculture, Baltimore County Soil Conservation District, Carroll County Soil Conservation District, the Baltimore Metropolitan Council, and the Reservoir Watershed Protection Committee. It was first signed in 1979 to protect and otherwise improve the quality of water within three water supply reservoirs: Loch Raven Reservoir, Liberty Reservoir, and Prettyboy Reservoir. The reservoirs are owned and operated by Baltimore City.

The most important goal of the agreement is to maintain high quality drinking water for metropolitan Baltimore including parts of Carroll, Baltimore, Howard and Anne Arundel counties and provide habitat and recreational uses. In order to meet these goals a corresponding action strategy was developed. The action strategy is broken down into seven categories:

- Reservoir and Watershed Assessment
- Point Source Management
- Nonpoint Source Management, Land Use and Resource Protection
- Management of Municipal Watershed Property
- Toxins, Pathogens, Potential Spills and Disinfectant Byproduct Precursors
- Reservoir Watershed Protection Program: Coordination and Administration
- Public Awareness

More information on the Reservoir Watershed Management Agreement is available at: http://www.baltometro.org/content/view/10/124/

Stormwater Management Act of 2007 (HouseBill 786)

Although the Stormwater Management Act of 2007 does not itself establish any stormwater management rules or regulations, it requires the MDE to establish rules and regulations that are consistent with a number of objectives outlined in the Bill. One of the primary requirements is that MDE establish regulations and a model ordinance that require:

- The implementation of environmental site design to the maximum extent practicable.
- The review and modification, if necessary, of planning and zoning or public works ordinances to remove impediments to environmental site design implementation.

In HouseBill 786, environmental site design includes:

- Optimizing conservation of natural features, such as drainage patterns, soils and vegetation.
- Minimizing use of impervious surfaces, such as paved surfaces, concrete channels roofs and pipes.
- Slowing down runoff to maintain discharge timing and to increase infiltration and evapotranspiration.

More information on HB 786 is available at: http://www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/swm2007.asp

Total Maximum Daily Loads (TMDLs)

TMDLs are a requirement of the Clean Water Act, which calls on each state to list its polluted water bodies and to set priorities for TMDL development. Water bodies are classified as "impaired" when they are too polluted or otherwise degraded to support their designated and existing uses. The impaired waters list is called the 303(d) list, named after the section in the Act that requires it.

For each combination of waterbody and pollutant on the 303(d) list, states must estimate the maximum allowable pollutant load, or TMDL, that the water body can receive and still meet its designated water quality standards. As of 2004, there are 659 listings in Maryland that may require a TMDL. For a complete listing of these impaired waters, see: http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/

Water Resources Element Law (HouseBill 1141)

This recently passed legislation requires all counties and municipalities that exercise planning and zoning authority to adopt a Water Resources Element (WRE) in their comprehensive plans by October 1, 2009. The purpose of the WRE is to ensure that future comprehensive plans reflect the opportunities and limitations presented by local and regional water resources. According to the *Water Resources Element of the Comprehensive Plan Guidance Document*, published by the Maryland Department of Planning (MDP) (2007), the Water Resources Element should:

- Identify drinking water and other water resources that will be adequate for the needs of existing and future development proposed in the land use element of the plan, considering available data provided by MDE.
- Identify suitable receiving waters and land areas to meet the stormwater management and wastewater treatment and disposal needs of existing and future development proposed in the land use element of the plan, considering available data provided by MDE.
- Adopt a WRE in the comprehensive plan on or before October 1, 2009, unless extensions are granted by MDP pursuant to law.

More information on HB 1141 is available at: http://www.mdp.state.md.us/hb1141.htm

Conclusion

Through the Roundtable process, Carroll County is taking an important step towards improving local water quality and quality of life for citizens. In addition, the roundtable will help Carroll County address the regulations and agreements discussed in this section. The overall goal of these regulations and agreements is to improve the quality of local water bodies through a reduction in impervious cover that reduces stormwater runoff. Several of the regulations and agreements specifically identify the use of BSD as a tool to help achieve this goal. The implementation of the recommendations identified in the roundtable will result in the reduction of future impervious cover, treatment of existing impervious cover and conservation of natural resources. The water quality improvements that can be attained through BSD will improve the health of the local watershed, drinking water resources and ultimately the Chesapeake Bay Watershed.

Table 2. Matrix of Better Site Design Principle Recommendations, Regulations and Agreements

Better Site Design Principle Recommendations		Regulations and Agreements					
		Antideg-radation Policy	NPDES	Reservoir Watershed Management Agreement of 2005	Stormwater Management Act of 2007 (HB 786)	TMDL's	Water Resources Element Law (HB 1141)
#1. Street Width		✔	✔	✔	✔	✔	✔
A. Encourage local jurisdictions to adopt County street widths		✔	✔	✔	✔	✔	✔
B. Adopt subdivision Roads Matrix Table		✔	✔	✔	✔	✔	✔
#2. Street Length		✔	✔	✔	✔	✔	✔
A. Educate planning commission							
B. Explore lot yield calculations		✔	✔	✔	✔	✔	✔
C. Explore density bonus for clustering		✔	✔	✔	✔	✔	✔
#3. Right-of-Way Width		✔	✔	✔	✔	✔	✔
A. Encourage design flexibility found in PUDs		✔	✔	✔	✔	✔	✔
#4. Cul-de-Sacs		✔	✔	✔	✔	✔	✔
A. Offer credit for landscaping islands		✔	✔	✔	✔	✔	✔
B. Promote bioretention islands		✔	✔	✔	✔	✔	✔
C. Prohibit on street parking for snow removal		✔	✔	✔	✔	✔	✔
#5. Vegetated Open Channels		✔	✔	✔	✔	✔	✔
A. Continue use of wide shoulder roads		✔	✔	✔	✔	✔	✔
B. Incorporate stormwater treatment into roads		✔	✔	✔	✔	✔	✔
#6. Parking Ratios		✔	✔	✔	✔	✔	✔
A. Support Parking Ratios Review Team		✔	✔	✔	✔	✔	✔
B. Set maximum parking standards		✔	✔	✔	✔	✔	✔
#7. Parking Codes		✔	✔	✔	✔	✔	✔
A. Develop a Shared Parking Agreement		✔	✔	✔	✔	✔	✔
#8. Parking Lots		✔	✔	✔	✔	✔	✔
A. Encourage use of permeable pavement		✔	✔	✔	✔	✔	✔
#9. Structured Parking		✔	✔	✔	✔	✔	✔
A. Offer incentives for Structured parking		✔	✔	✔	✔	✔	✔
#10. Parking Lot Runoff		✔	✔	✔	✔	✔	✔
A. Reduce parking ratios		✔	✔	✔	✔	✔	✔
B. Extend stormwater requirements outside of Surface Watershed Area		✔	✔	✔	✔	✔	✔
C. Encourage pervious pavement		✔	✔	✔	✔	✔	✔

=minimize creation of future impervious cover =treat existing impervious cover =conservation of natural areas

SUMMARY OF REGULATIONS AND AGREEMENTS

Better Site Design Principle Recommendations		Regulations and Agreements					
		Antideg-radation Policy	NPDES	Reservoir Watershed Management Agreement of 2005	Stormwater Management Act of 2007 (HB 786)	TMDL's	Water Resources Element Law (HB 1141)
#11. Open Space Design		✔	✔	✔	✔	✔	✔
A. Make cluster development first option		✔	✔	✔	✔	✔	✔
B. Encourage cluster development		✔	✔	✔	✔	✔	✔
C. Develop lot yield formula		✔	✔	✔	✔	✔	✔
D. Educate planning commission		✔	✔	✔	✔	✔	✔
#12. Setbacks and Frontages		✔	✔	✔	✔	✔	✔
A. Reduce current minimum standards		✔	✔	✔	✔	✔	✔
B. Continue flexibility in cluster developments		✔	✔	✔	✔	✔	✔
#13. Sidewalks		✔	✔	✔	✔	✔	✔
A. Encourage use of permeable materials		✔	✔	✔	✔	✔	✔
B. Direct runoff to infiltration areas		✔	✔	✔	✔	✔	✔
C. Sidewalks on one side of the road		✔	✔	✔	✔	✔	✔
D. Develop master pedestrian/bicycle plan		✔	✔	✔	✔	✔	✔
E. Encourage use of walking paths		✔	✔	✔	✔	✔	✔
#14. Driveways		✔	✔	✔	✔	✔	✔
A. Reduce driveway width to 9ft		✔	✔	✔	✔	✔	✔
B. Provide incentives for permeable pavement		✔	✔	✔	✔	✔	✔
C. Continue use of Use In Common driveways		✔	✔	✔	✔	✔	✔
#15. Open Space Management		✔	✔	✔	✔	✔	✔
A. Encourage management of open space through three options		✔	✔	✔	✔	✔	✔
B. Develop open space master plan		✔	✔	✔	✔	✔	✔
C. Provide education on open space		✔	✔	✔	✔	✔	✔
D. Educate landowners on open space easements		✔	✔	✔	✔	✔	✔
#16. Rooftop Runoff		✔	✔	✔	✔	✔	✔
A. Continue to disconnect rooftops		✔	✔	✔	✔	✔	✔
B. Investigate rainwater harvesting		✔	✔	✔	✔	✔	✔
C. Investigate green roofs		✔	✔	✔	✔	✔	✔
#17. Buffer Systems		✔	✔	✔	✔	✔	✔
A. Changes to Water Resource Management Manual		✔	✔	✔	✔	✔	✔
B. Change to Steep slope buffer calculation		✔	✔	✔	✔	✔	✔
C. Stream Buffer Education Program		✔	✔	✔	✔	✔	✔
D. Encourage a tax incentive for reforestation of stream buffers							

=minimize creation of future impervious cover =treat existing impervious cover =conservation of natural areas

Better Site Design Principle Recommendations		Regulations and Agreements					
		Antideg-radation Policy	NPDES	Reservoir Watershed Management Agreement of 2005	Stormwater Management Act of 2007 (HB 786)	TMDL's	Water Resources Element Law (HB 1141)
#18. Buffer Maintenance		✔	✔	✔	✔	✔	✔
A. Educate landowner on Water Resource Protection Easement		✔	✔	✔	✔	✔	✔
B. Educate landowner on stream buffer		✔	✔	✔	✔	✔	✔
#19. Clearing and Grading		✔	✔	✔	✔	✔	✔
A. Encourage preservation of natural areas between 15-60 feet of a home.		✔	✔	✔	✔	✔	✔
#20. Tree Conservation		✔	✔	✔	✔	✔	✔
A. Increase preservation of tree canopy on individual lots		✔	✔	✔	✔	✔	✔
B. Include additional landscape requirements in higher density developments.		✔	✔	✔	✔	✔	✔
C. Create an incentive for planting trees on higher density developments.		✔	✔	✔	✔	✔	✔
D. Evaluate stormwater credits for tree plantings in higher density developments.		✔	✔	✔	✔	✔	✔
#21. Conservation Incentives		✔	✔	✔	✔	✔	✔
A. Allow tax credits for reforestation of buffers		✔	✔	✔	✔	✔	✔
B. Use of cluster development		✔	✔	✔	✔	✔	✔
C. Establish Transferable Development Rights		✔	✔	✔	✔	✔	✔
D. Consider density compensation as an incentive		✔	✔	✔	✔	✔	✔
E. Flexibility in development standards.		✔	✔	✔	✔	✔	✔
#22. Stormwater Outfalls		✔	✔	✔	✔	✔	✔
A. Continue existing stormwater and water resource management programs		✔	✔	✔	✔	✔	✔
B. Comply with new Maryland stormwater regulations		✔	✔	✔	✔	✔	✔
C. Comply with new regulations		✔	✔	✔	✔	✔	✔
D. Reduce existing pollutant loads		✔	✔	✔	✔	✔	✔
E. Investigate creation of stormwater utility		✔	✔	✔	✔	✔	✔
F. Educate community on stormwater		✔	✔	✔	✔	✔	✔
G. Develop stormwater incentive program		✔	✔	✔	✔	✔	✔
H. Encourage communities to adopt County stormwater and water resource regulations		✔	✔	✔	✔	✔	✔
New Principle: Septic Systems		✔	✔	✔	✔	✔	✔
A. Septic system maintenance		✔	✔	✔	✔	✔	✔
B. Community septic systems		✔	✔	✔	✔	✔	✔

=minimize creation of future impervious cover =treat existing impervious cover =conservation of natural areas

Membership Statement of Support

This document of Model Development Principles and associated recommendations for implementation was crafted in conjunction with the diverse cross-section of development, local government, non-profit, environmental, and other community professionals who participated in the Carroll County Builders for the Bay Site Planning Roundtable.

Members of the Roundtable provided the technical experience needed to craft and refine the model development principles for Carroll County. These recommendations reflect our professional and personal experience with land development and do not necessarily carry the endorsement of the organizations and agencies represented by their members. Endorsement implies support of the principles and recommendations as a package and does not necessarily imply an equal level of support among individual recommendations by all Roundtable members.

The members of the Carroll County Site Planning Roundtable endorse the model development principles presented in the document: Recommended Model Development Principles for Carroll County, Maryland.

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Model Development Principles

Recommended by the Carroll County Site Planning Roundtable

Residential Streets and Parking Lots Recommendations

PRINCIPLE #1. STREET WIDTHS

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Identify local jurisdictions that do not meet the minimum standards set forth by the county guidelines on street width and work through the Council of Governments to change those that are deficient to reflect the county codes for street widths.

B. Insert Table 3 into the Design Manual Vol. 1 Roads and Storm Drains Chapter 2: Design Specifications For County Roads, Section 2.6.1 Standards.

Narrow Residential Road

Table 3. Subdivision Roads Matrix

Road Type/Zoning	Paving Width (feet)	Right of Way Width (feet)	Classification Type / CC Standard Plate	Average Daily Trips (Maximum Length)
Residential : R-20,000, R-10,000 and R- 7,500	22	40	Loop & Cul-de-sac road Closed section / Plate 21	Maximum = 250 ADT (Max. Length = 1500')
Residential : R-20,000, R-10,000 and R- 7,500	30	50	Urban Local Closed Section / Plate 33	Maximum = 1000 ADT (No max. length)
Urban Collector *	26	50	Urban Collector Closed section / Plate 25-A	Over = 1000 ADT (No max. length)
Residential : R-40,000 Agricultural, Conservation	18	44	Loop & Cul-de-sac road Open Section / Plate 20	Maximum = 250 ADT (Max. Length = 1500')
Residential : R-40,000 Agricultural, Conservation	20	50	Local - Open Section Open Section / Plate 18	Maximum = 1000 ADT (No max. length)
Commercial and/ or Industrial Subdivisions	30	50	Commercial - Industrial Road Closed Section / Plate 22	No max. ADT No max. length

*A restricted access collector road. Used primarily in urban areas and high density residential districts. Direct access from adjacent lots is generally not permitted. January 24, 2008

Rationale

Residential streets are often unnecessarily wide and represent the largest component of impervious cover in a subdivision. Narrower street widths not only reduce impervious cover, but also promote lower vehicular speeds, increased safety and can reduce construction and maintenance costs (CWP, 1998b). Based on the review of the current codes the subcommittee felt that the current standards set forth in the codes for street widths reflected acceptable standards for better site design. Two concerns were addressed through the recommendations that include; 1. Develop a clearer representation of existing codes in the manual using Table 3 that synthesizes information form several areas of the design manual. 2. Determine the differences between Carroll County and local municipality's road width standards.

PRINCIPLE #2. STREET LENGTH

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

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Educate the Planning Commission on the water quality and economic benefits of clustering to reduce street length.
B. Explore alternatives to calculating lot yield in clustering plans.
C. Explore density bonuses for clustering.

Rationale

Total street length is often a function of the frontage, number of entrances, pedestrian safety and physical site conditions. Guidance encouraging thoughtful, flexible and practical subdivision design criteria that reduces the overall street length can be useful to reduce impervious cover while maintaining the number of desired dwelling units (CWP, 1998b). Cluster development was identified as a means to shorten street lengths in a given community. The subcommittee identified several barriers that prevent cluster development in Carroll County and made recommendations to overcome these barriers.

PRINCIPLE #3. RIGHT-OF-WAY WIDTH

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

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Continue trend towards design flexibility apparent in Planned Unit Development (PUD) standards.

Rationale

A wide right-of-way has several impacts that include greater area clearing during road construction that may result in a greater loss of existing trees. Second, a wide right-of-way consumes land that may be better used for housing lots, making it more difficult to achieve a more compact site design (CWP, 1998b). As the Subdivision Roads Matrix chart from Principle 1 indicates, right-of-way widths in Carroll County are generally agreeable with better site design. The subcommittee identified that clarity in the codes would be helpful. It was also recognized that the flexibility inherent in Planned Unit Developments (PUD) such as reducing setbacks and placing all utilities under the road way would allow further reductions in impervious cover.

PRINCIPLE #4. CUL-DE-SACS

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Offer credit for the landscaping requirement in the landscaping manual for landscaped islands.
B. Promote use of landscaped islands as stormwater bioretention areas provided they are designed with an appropriate under drain system.
C. Prohibit the on-street parking of cars in cul-de-sacs during snow events.

Missed opportunity: A cul-de-sac that could have incorporated a landscaped island

Rationale

A large cul-de-sac radius creates a large circle of impervious cover that is never fully utilized for turning movements. A T-shaped turnaround generates approximately 75% less impervious cover than a 40 foot radius circular turnaround (CWP, 1998b). Carroll County has very good cul-de-sac standards and also allows loop roads and "T" turnarounds. The subcommittee decided that cul-de-sac islands could serve as bioretention facilities provided they were designed with the proper under drain system. In addition, the concern of providing enough room for adequate snow removal was addressed by restricting parking during snow events.

PRINCIPLE #6. PARKING RATIOS

The required parking ratio governing a particular land use or activity should be enforced as both a minimum and a maximum 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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Support the recommendations of the Carroll County Parking Ratios Review Team.
B. The Carroll County Parking Ratios Review Team, with help from the Center for Watershed Protection on national standards should set maximum parking space standards for new retail developments.

Parking lot with excess parking spaces.

Rationale

Communities often determine minimum parking ratios by either; adopting and modifying the requirements of neighboring communities or by using the Institute of Transportation Engineers informational publication. In many cases, parking ratios result in far more spaces than are actually required because ratios are typically set as minimums not maximums (CWP, 1998b). A County review committee presented our subcommittee with a draft of proposed changes to the parking ratios in the code based on national and regional standards. These proposed changes were accepted by our group as furthering Carroll County's standards towards better site design. The subcommittee came to consensus on a maximum parking ratio for retail parking lots. Further discussion of parking maximums should be considered in the County review committee.

PRINCIPLE #7. PARKING CODES

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

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Incorporate a sample shared parking agreement in the Carroll County Development Review Manual.

Rationale

Increased general ridership on the Carroll Area Transit System (CATS) may lower parking demands by reducing the number of cars entering and parking in commercial and business Districts. CATS ridership is increasing as it becomes more available and convenient for the general population to ride. The introduction and popularity of shopping shuttles, improved access to the campuses of McDaniel and Carroll Community colleges, and the growth of the county-wide fixed route service, all present opportunities for a reduction in demand for parking. New language was recently added to the county parking code that promotes a further reduction in parking space requirements likely to result from shared parking arrangements.

PRINCIPLE #8. PARKING LOTS

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 spill-over parking areas.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Change the Carroll County Code of Public Local Laws and Ordinances; Article VI, 103-25 C (5) to; "Surfacing. All off street parking facilities providing for more than 5 vehicles shall be surfaced in the following order of preference; permeable paving, stone, traditional paving or similar all weather surface."

Rationale

Parking lots are the largest component of impervious cover in most commercial and industrial zones, but conventional design practices do little to reduce the paved area in parking lots (CWP, 1998b). Current Carroll County stall dimensions fall within the guidelines for better site design standards. The subcommittee felt that requiring small car spaces isn't applicable as current parking spaces are already too small for the average Carroll County vehicle. The subcommittee also created a hierarchy of paving material options that would better promote the use of permeable pavement.

PRINCIPLE #9. STRUCTURED PARKING

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

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Offer incentives such as additional floor area or additional floors in the building plan for developers to construct structured parking that will offset the higher costs. This may or may not require a waiver in height requirements.

Rationale

The type of parking facility constructed in a given area is a reflection of the cost of land and construction expenses. In suburban and rural areas where land is relatively inexpensive, surface parking costs much less than a parking garage (CWP, 1998b). Land values in Carroll County are not high enough to offset the cost of building structured parking compared to constructing flat parking lots. Adjusting the height standard in the county and/or allowing additional floor area should be considered to encourage structured parking.

Lot Development Recommendations

PRINCIPLE #11. OPEN SPACE DESIGN

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Carroll County should consider making cluster development the first option on major subdivisions in the Conservation Zone.
B. Carroll County should encourage cluster development in the R zoning districts.
C. Subcommittee participants support the development of a formula to determine the maximum number of lots allowed in a cluster subdivision.
D. Educate the Carroll County Planning Commission on the environmental benefits to cluster development. Provide examples with quantitative values to show the benefits of cluster development as compared to conventional development.

Rationale

Cluster development was identified as providing environmental benefits to the County including land conservation, increase in groundwater recharge and reduction in impervious surfaces. Cluster development can reduce impervious cover by 40% to 60%, thereby conserving significant portions of natural resources on a site (*Schueler, 1995*). The subcommittee identified disincentives that currently exist that act to hinder cluster development to take place. This includes the current requirement of determining the maximum number of lots for a conventional plan before the submittal of a cluster development plan, particularly when the developer is required to conduct percolation tests to prove the feasibility of the lot yield. The recommendations address actions that would encourage further cluster development in the County.

PRINCIPLE #12. REDUCE SETBACKS AND FRONTAGES

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Reduce the current minimum standards to allow for more flexible development. These changes are shown in the Table 4.

Development with shortened front setbacks.

Table 4. Changes to minimum setbacks and frontage standards.

Zone	Front (feet)	Side (feet)	Rear (feet)	Lot Width (feet)
Agriculture District	40	20	50	150
Conservation District	~~50~~ 40	~~50~~ 20	50	300
Planned Unit Development	~~30~~ 20	10	~~35~~ 20	70
R-40,000	~~40~~ 30	~~20~~ 12	~~50~~ 40	~~150~~ 100
R-20,000	~~40~~ 20	~~12~~ 10	~~50~~ 20	~~100~~ 80
R-10,000	~~35~~ 20	~~12~~ 10	~~40~~ 20	70
R-7,500*	~~25~~ 20	10	~~35-40~~ 20	60

* One family 1 and 1 ½ stores and one family 2 and 2 ½ stories

B. In cluster developments, continue to allow for flexible setback and frontage standards that promote both water quality protection and minimize the footprint of development.

Rationale

The minimum setback and frontage standards do not allow for smaller lot sizes. Relaxing setbacks and the use of non-traditional designs can minimize impervious surfaces including driveway lengths. Relaxing minimum setbacks also allows for smaller lot sizes that is an important design element of cluster development. The recommendations are made to allow for flexibility in lot layout, provide opportunities to preserve more unfragmented open space and reduce the creation of new impervious cover.

PRINCIPLE #13. SIDEWALKS

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.

Development with sidewalks on one side of the road

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Encourage the use of alternative, permeable sidewalk surfaces.
B. Where appropriate, slope sidewalks to direct runoff into infiltration areas.
C. Encourage the use of sidewalks on one side of the street where appropriate.
D. Develop a master plan for pedestrian and bicycle paths. This should be done on a county-wide and specific town or planning area basis.
E. Encourage the use of walking paths and/or trails that connect residential areas to desired destinations, i.e. schools, town centers, etc.

Rationale

The development of a pedestrian/bicycle path master plan would allow for the planning of a system of pathways that connect residents to desired destinations and reduces dependency on automobiles. It would also help eliminate the installation of sidewalks that lead to nowhere. This system should use a combination of sidewalks, trails or other walking paths constructed of surfaces that includes permeable pavement.

PRINCIPLE #14. DRIVEWAY ALTERNATIVES

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

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Reduce the minimum driveway width from 10 feet to 9 feet in the Development Review Manual.
B. Provide stormwater incentives for developers to use permeable pavement on driveways.
C. Encourage the continued use of Use In Common driveways in the county to reduce impervious cover.

Example of a shared driveway

Rationale

Studies show that 20% of the impervious cover in residential subdivisions can consist of driveways (Schueler, 1995). In the County, current driveway standards allow for Use In Common driveways. The County doesn't dictate the type of surface a developer uses on a residential driveway. To encourage less impervious surface, the use of permeable pavement could be encouraged through incentives.

PRINCIPLE #15. OPEN SPACE MANAGEMENT

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

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Encourage the management of open space in the conservation zone through three options: public ownership, private ownership and land trusts. When open space is in private ownership, encourage the open space to all be on one homeowner's lot.
B. Develop a countywide open space master plan that would identify land that should be protected.
C. Educate landowners and homeowner associations on the management of open space including natural area management.
D. Assure that open space easement terms are reasonable and that land owners know and accept the terms of the easement.

Rationale

Currently, open space is owned by the county, private homeowner or a county owned open space maintenance district. In some cases, the open space might be located in several homeowners' backyards. This makes management of open space more difficult as those homeowners might not be aware or respectful of the management requirements of the open space. Education on the importance of open space is needed for realtors and homeowners. In addition, a countywide open space master plan would allow for key open space parcels to be targeted for protection.

NEW PRINCIPLE: SEPTIC SYSTEMS

Require the use of septic system designs that remove higher amounts of nitrogen and phosphorus than conventional septic systems.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Require maintenance of septic systems to ensure the systems efficiency.
B. Encourage further research to determine the feasibility of the use of community septic systems that includes identifying the appropriate maintenance and ownership options.

Rationale

Research has shown that septic systems are a significant source of nitrogen to the Chesapeake Bay. In Carroll County, development outside the public sewer and water districts utilizes septic systems. The majority of septic systems use a conventional septic tank and drain field design. Surveys show that in the Chesapeake Bay nearly half of all homeowners fail to regularly inspect or clean out their systems and at least five percent of all septic systems are failing in any given year. Even with functioning septic systems, research has shown that conventional systems remove about ten to twenty percent of the nitrogen that enters them. In comparison, alternative septic system designs including both recirculating sand filters and aerobic treatment units can remove 50 to 60% of the nitrogen that enters the system. Table 5 estimates that nutrient loading for both nitrogen and phosphorus indicate that an alternative septic system will produce more than 30 lbs less nitrogen and up to half the phosphorus of a conventional system over a twenty-year time span (CWP, 2000). The use of community septic systems would also have the effect of preserving more open space and reducing impervious areas.

Table 5. Nutrient Loading From Septic Systems (CWP, 2000)

System	F low Rate (L/day)	Concentration (mg/l)	Delivery Factor*	Lbs Delivered over 20 yrs
Nitrogen				
Innovative	245	40	0.3	47
Conventional	245	40	0.6	94
Failing	245	40	0.85	134
WWTP	245	9**		36
Phosphorus				
Innovative	245	15	0.1	6
Conventional	245	15	0.25	12
Failing	245	15	0.75	44.
WWTP	245	.5**		2

*Delivery factors are estimated nitrogen loads reaching the Bay based on reported removal efficiencies.

** Concentration rates for WWTP's were taken from annual averages reported for 1995-1999.

Natural Resource Management Recommendations

PRINCIPLE #17. STREAM BUFFER SYSTEMS

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

Overly manicured stream buffer

A. Changes to the Water Resource Management Manual (Carroll County, 2007)

- All Stream Buffers shall be a minimum of ~~50~~ 75 feet wide from each stream bank. The existing conditions of the site shall determine the ultimate Stream Buffer width. Land features such as wetlands and slopes greater than 25% do not count toward the calculation of the Stream Buffer width.
- The average stream valley slope shall be calculated to determine the stream buffer width for each area along stream; it shall be measured at regular intervals along the stream through the site. The average stream valley slope shall be measured from the edge of the stream bank to a point 100 feet from the edge of the stream bank (measured perpendicular to the stream). The Stream Buffer is calculated by adding two feet to the minimum Stream Buffer width (~~50~~') 75' for each one percent of the adjacent stream valley slope.

B. As steep slopes are sometimes adjacent to streams and are included in the buffer calculations, these calculations occasionally result in a buffer extending well beyond the top of the steep slope. We propose to amend the maximum buffer to a limit of 25 ft. beyond the top of steep slopes when a 100 ft. buffer width has been exceeded.

C. A comprehensive, stream buffer education program should be established for residents having streams on their property. This should include:

- A mechanism for educating residents through education of realtors (Suggested that the DNR regional forester present to realtors annually).
- Targeted mailings to landowners that own land adjacent to streams or other water bodies (particularly those that are unbuffered). Educate them on the water quality importance of buffers and the availability of assistance programs for buffer planting. Education programs could be coordinated with watershed groups such as the Prettyboy Watershed Alliance, Patapsco Heritage Greenway and Trout Unlimited.

D. A property tax incentive for the reforestation of stream buffers is encouraged. Properties would be taxed at the agricultural rate for that portion of their property put into a forested stream buffer with a longer- term goal of a reduced tax rate for those who maintain existing forested buffers on their properties. The incentive would be contingent on maintenance of the stream buffer, a high survival rate and maintenance of a forested condition. Maintenance standards should be based on the standards set in the State of Maryland Forest Conservation Act and the County's Landscape Manual.

Rationale

Forested stream buffers are critical to healthy functioning streams that create habitat for fish and aquatic insects and process and filter potential contaminants. After reviewing scientific studies on nutrient and sediment removal in stream buffers a decision was made to recommend an increase in the minimum stream buffer of 50 feet to 75 feet (Mayer *et. al.*, 2005; Wenger, 1999). A slight adjustment was also made to reduce the mandatory size of the buffer when it exceeded what was supported by the scientific literature.

PRINCIPLE #18. BUFFER MAINTENANCE

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Improved education of the landowner when a Water Resources Protection Easement agreement is signed at settlement. It currently states what is required but not why. It would be helpful to include information explaining the many benefits that stream buffers provide to water resources.
B. An educational brochure on the importance of stream buffers could be distributed to the landowner during a property settlement as well.

Rationale

Stream buffer maintenance had strong existing requirements in County regulations including the ESD, penalties, fencing during construction and signage post construction. Improved homeowner education was a continued theme and several improvements to the landowner agreement were made. Maintenance is a critical component of a proper functioning stream buffer and research has shown that lack of education and demarcation results in higher levels of disturbance (Cooke, 1991).

PRINCIPLE #19. CLEARING AND GRADING

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

Changes to the Code of Public Laws and Ordinances (Carroll County, 2007) are suggested to further meet the intention of this principle.

115-2 A. (3). Applicability

A. Though the LOD is set at 60 feet to avoid conflicts with landowners who wish to put sheds, pools or other structures near their homes, developers are encouraged to preserve natural areas 15-60 feet from the home in a natural condition. This improves property values and energy efficiency and reduces stormwater runoff. When trees are saved within this

area, they should be demarcated and the drip line protected and dying or hazardous trees should be removed from this area to minimize the potential for future property damage.

Rationale

Minimizing mandatory clearing and grading has the potential to maintain more forest canopy on lots and further reduce stormwater runoff and disturbance of native soils. Research has demonstrated that undisturbed native soils had far higher infiltration rates than their counterparts on soils that had been cleared during the development process (Pitt *et al.*, 1999; Ocean County SCD, 2001).

PRINCIPLE #20. TREE CONSERVATION

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. The recommendation in principle #19 supports less clearing and grading but also increased preservation of tree canopy on individual lots.

B. A recommendation is made to include additional landscaping criteria for reforestation/ tree conservation on higher density development projects (greater than 4 units/acre).

Trees protected during development

C. A recommendation is also made to create an incentive for reforestation/ conservation as reforestation on higher density lots can help reduce stormwater runoff, provide shading and energy conservation benefits and improve aesthetics (Cappiella, *et.al.*, 2006).

D. Evaluate granting stormwater credit for reforestation or preserving forest on individual lots in higher density forest conservation.

Rationale

The County has strong tree conservation requirements in part due to the State of Maryland Forest Conservation Act and the County's Landscape Manual. Additional improvements were recommended for allowances for forest conservation on higher density applications. Native trees, shrubs and grasses are important contributors to the overall quality and viability of the environment. They provide numerous benefits that include the reduction of stormwater runoff, improve air quality, provide habitat, improve soil and water quality, reduce construction costs and increase property values (Cappiella, *et al*, 2005).

PRINCIPLE #21. LAND CONSERVATION INCENTIVES

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.

Recommendation

The roundtable supports this principle and makes the following recommendations:

A. Tax credit for reforestation of buffers for individual property owners, even small landowners (See Principle #17).
B. The effective use of cluster development is an important factor in allowing for the conservation of greater amounts of resource lands and for reducing the impact of landowners on buffers by keeping piecemeal stream buffers out of individual lots.
C. More concentrated development outside of conservation and agricultural areas is critical to the long-term preservation of clean drinking water and resource lands. Transferable Development Rights (TDR's) from conservation and agricultural areas to urban areas is an important step in this direction. An effort should be made to establish TDR's and to provide incentives or seed money to help them work effectively.
D. Consider density compensation as an incentive for land conservation.
E. Flexibility and a can-do attitude are critical when presented with new, outside the box concepts that improve both the bottom line for development and water quality. This might include alternatives for long term protection options for forest land or increased flexibility in development standards when there are benefits to the environment and the developer.

Rationale

Incentives for conservation are a critical element of improving the protection of natural resources and clean drinking water in Carroll County. Few communities provide incentives for developers to consider better site design techniques that promote preservation of natural areas. In fact, lengthy plan reviews, additional up-front costs for the developer and uncertainty in plan review and approvals dissuade many developers from proposing conservation measures (CWP, 1998b).

Stormwater Management Recommendations

PRINCIPLE #5. VEGETATED OPEN CHANNELS

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.

Open section roadway using wide shoulder

Recommendation

The roundtable supports this principle and makes the following recommendations.

A. Continue to require that all new open section roadways be disconnected from the storm drain system using the wide shoulder technique.
B. Conduct further investigation into incorporating stormwater conveyance and treatment features, such as grass channels, stormwater curb extensions and linear stormwater tree pits, into closed section roadways.

Rationale

Streets generate higher stormwater pollutant loads than any other source area within residential developments (Bannerman *et al.*, 1993, Steuer *et al.*, 1997). When used to convey roadway runoff, vegetated open channels can remove some of these pollutants and can help reduce stormwater runoff volumes. Carroll County currently requires all new open section roadways to be disconnected from the storm drain system using "wide shoulders". The subcommittee felt that this practice supports better site design and should be continued. The subcommittee also felt that incorporating stormwater conveyance and treatment practices, such as grass channels, stormwater curb extensions and linear stormwater tree pits into closed section roadways could reduce stormwater pollutant loads and provide other benefits, such as improved aesthetics and increased tree canopy.

PRINCIPLE #10. PARKING LOT RUNOFF

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.

Recommendation

The roundtable supports this principle and makes the following recommendations.

Parking lot runoff treated by a swale

A. Review its existing parking ratios, codes and design guidelines and, where practical, make revisions to reduce the amount of impervious cover and, consequently, the amount of stormwater runoff, generated on parking lots.
B. Extend the requirement that landscape islands and other vegetated areas on development projects requiring site plans be used to manage parking lot runoff to areas that are currently outside of the Surface Watershed Area.
C. Encourage the use of pervious pavement to reduce stormwater runoff volumes, where site characteristics allow, particularly in overflow parking areas, by providing meaningful incentives for its use.

Rationale

Parking lots are a significant source of stormwater pollution in the urban and suburban landscape, particularly in commercial and industrial developments. Research indicates that parking lot runoff accounts for between 25% and 66% of the suspended solids, phosphorus, copper and zinc pollutant loads in commercial and industrial stormwater runoff (Bannerman *et al.*, 1992). Stormwater treatment practices, such as bioretention areas and filter strips, which can be integrated into landscaping areas and traffic islands, can remove some of these pollutants from parking lot runoff.

Carroll County currently requires landscape islands and other vegetated areas on development projects requiring site plans within the Surface Watershed Area to be used to manage parking lot runoff. The subcommittee felt that this requirement helps supports better site design and should be extended to the rest of the County. The subcommittee also felt that the County should reduce the size of parking lots thorough the review and revision of existing parking ratios, codes, and design guidelines. This review has been completed by the Parking Ratios Review Team.

PRINCIPLE #16. ROOFTOP RUNOFF

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.

Recommendation

The roundtable supports this principle and makes the following recommendations.

A. Continue to require that all new rooftops be disconnected from the storm drain system through the use of grading or dry wells.

B. Further investigate and encourage the use of rainwater harvesting as a stormwater management practice and as a source of water for landscape irrigation and other purposes.

C. Further investigate the use of green roofs as a stormwater management practice, particularly on commercial, industrial and institutional development projects.

Disconnected residential downspout

Rationale

Rooftops can generate significant stormwater runoff volumes. Research has shown that sending rooftop runoff over a pervious surface before it reaches the storm drain system can reduce annual stormwater runoff volumes by as much as 50% at development sites (Pitt, 1987). Carroll County currently requires all new rooftops to be disconnected from the storm drain system using either grading or dry wells. The subcommittee felt that this requirement helps reduce stormwater runoff volumes and pollutant loads at development sites and should be continued. The subcommittee felt that other stormwater management practices, such as rainwater harvesting and green roofs, could also be used to manage rooftop runoff. In addition to their ability to reduce stormwater runoff volumes, these practices provide a number of other benefits, including reduced water consumption, reduced heating and cooling costs, and reduced demand on the County's groundwater resources.

PRINCIPLE #22. STORMWATER OUTFALLS

New and redeveloped stormwater outfalls should not discharge untreated stormwater into jurisdictional wetlands, aquifers, or other water bodies, or otherwise facilitate the degradation of these water resources.

Recommendation

The roundtable supports this principle and makes the following recommendations.

A. Continue to support the existing stormwater and water resource management programs.

B. Review existing stormwater and water resource management programs once revisions to the Maryland Stormwater Management Regulations and Design Manual are complete and, if necessary, adjust them to ensure that they are at least as protective as the new state requirements.

C. Maintain a level of effort needed to ensure compliance with new stormwater regulations, including the Water Resources Element Law and Total Maximum Daily Loads, and continued economic development and prosperity.

D. Seek to reduce existing pollutant loads to comply with new stormwater regulations, including the Water Resources Element Law and Total Maximum Daily Loads:
   a. Reduce trash and debris loads conveyed to the storm drain system through its adopt-a-road and storm drain stenciling programs.

E. Increase the frequency of storm drain cleanouts to prevent storm drain clogging and reduce the amount of stormwater runoff that bypasses existing stormwater management practices.

F. Continue to support existing watershed restoration programs, including its illicit discharge detection and elimination and stormwater retrofit programs.

G. Encourage infill and redevelopment through meaningful incentives, such as fee reductions, tax incentives, flexible stormwater design criteria and an expedited plan review and permitting process.
   a. Investigate the creation of a stormwater utility to provide funding for ongoing stormwater and water resource management programs.
   b. Educate the community about the importance of stormwater and water resource management and about the benefits that stormwater management practices provide.

H. Develop a meaningful incentive program that encourages the development community to go above and beyond minimum stormwater management standards and design criteria at development and redevelopment sites.

I. Encourage all of the incorporated communities within the County to adopt regulations that are at least as protective as the County's stormwater and water resources management codes.

Rationale

Stormwater runoff generated at development and redevelopment sites can represent a significant threat to the quality of streams, wetlands and other surface and groundwater resources. Carroll County currently has comprehensive stormwater and water resource management programs that help protect its ground and surface water resources from the impacts of land development. To comply with new and existing stormwater regulations these programs must continue to be supported, as well as revised and expanded, when necessary. In order to do this, the subcommittee felt that the County should investigate additional funding sources and conduct public education and outreach on the importance of stormwater and water resource management.

The subcommittee also felt that the County should develop a meaningful incentive program that will encourage the development community to create environmentally sensitive site designs that go above and beyond established minimum stormwater and water resource management requirements. The subcommittee also felt that the County should encourage all of the incorporated communities within the County to adopt regulations that are at least as protective as the County's stormwater and water resources management codes.

Implementation Overview and Plan

The Roundtable process is a monumental step towards the promotion of environmentally-sensitive development in Carroll County through code, policy and regulatory updates. The Roundtable itself generated innovative ideas and fostered better communication and relationships amongst the County, community associations, environmental groups and development community. The strength of the Roundtable process lies in the expertise and diversity of the membership who collaboratively crafted the recommendations summarized in this document.

The recommendations must be incorporated and translated into the County's codes, policies and regulations in order for implementation of the Roundtable process to be recognized. One of the desired ends of this process is to have development occur that incorporates the recommendations of the Roundtable.

Table 6 was developed to guide the implementation of the Roundtable recommendations. Key staff from Carroll County and roundtable members will head up the implementation phase of the Roundtable process.

Table 6. Carroll County Roundtable Draft Implementation Plan

Task	Description
1. Presentation of Consensus Document to the full roundtable	• April 23, 2008 Meeting
2. Acceptance of recommendations by County Commissioners	• June 2008
3. Hold Implementation Meeting	• July 2008 • Includes identified Carroll County staff and subcommittee spokespersons
4. Education: Series of presentations to several groups	• Carroll County Planning Commission • Carroll County Home Builders • Environmental Advisory Group • Towns

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About the Partners

In December 2001, the Alliance for the Chesapeake Bay, the Center for Watershed Protection, and the National Association of Homebuilders launched a partnership known as Builders for the Bay. The primary mission of the Builders for the Bay coalition is to coalesce local builders, developers, environmental groups, local governments, and other important stakeholders in a process to review their existing codes and ordinances and begin a locality specific roundtable process. More information and resources related to the Builders for the Bay program can be accessed at www.buildersforthebay.net.

Center for Watershed Protection, Inc.

Founded in 1992, the Center for Watershed Protection (CWP) is a non-profit organization that works with local, state, and federal governmental agencies, environmental consulting firms, watershed organizations, and the general public to provide objective and scientifically sound information on effective techniques to protect and restore urban watersheds. The Center for Watershed Protection also acts as a technical resource for local and state governments around the country to develop more effective urban stormwater and watershed protection programs. For more information on CWP visit **www.cwp.org**.

Alliance for the Chesapeake Bay

The Alliance for the Chesapeake Bay (ACB) is the only organization in the Chesapeake region dedicated to restoring the Bay watershed exclusively through collaboration and consensus-building. ACB has a successful track record in building consensus on Bay policies, engaging volunteers in important hands-on restoration, educating citizens about the watershed, and strengthening the capacity of grassroots watershed organizations. Known as "The Voice of the Bay" for its unbiased information on Bay issues, ACB has worked to protect and restore the Bay watershed since 1971. Visit ACB at **www.alliancechesbay.org**.

Home Builders Association of Maryland

Since 1919 the Home Builders Association of Maryland (HBAM) has been the voice of the Housing Industry in central Maryland. HBAM, through its affiliate, the National Association of Home Builders, was an originator of the Builders for the Bay Roundtable process and also sponsored the Harford County, MD Roundtable. HBAM is a leader in research and development of innovative land use policy and planning techniques to prepare for the household and employment growth expected over the next 20 years in Maryland. Visit HBAM at **www.homebuilders.org**.

Carroll County

Carroll County is a national leader in farmland land preservation while fostering/promoting growth in localized community areas. In addition the County has been proactive in resource management and protection. The Builders for the Bay Roundtable process has offered the county an opportunity to partner with a variety of interest groups to evaluate the effectiveness of resource and development programs and create new management tools for the future. Carroll County is committed to continue to work with the roundtable partners as we identify and implement new approaches to restoring and protecting our natural resources and our communities. Visit Carroll County at **www.ccgovernment.carr.org**.

Builders for the Bay

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