

An aerial photograph of a coastal town in Worcester County, Maryland. The town is built on a peninsula and along the shores of a large, winding bay. The water is a deep blue, and the surrounding land is covered in dense green trees. In the distance, a larger city is visible across the water. The sky is clear and blue.

Recommended Model Development Principles for Worcester County, MD

A CONSENSUS OF THE LOCAL SITE PLANNING ROUNDTABLE

JULY 2004

Funded in part by:
National Estuaries Program (NEP)
Maryland Coastal Bays Program

As an initiative of the Maryland Coastal Bays Program:
Worcester County, MD
Ecologix Group, Inc.
Center for Watershed Protection
Eastern Shore Builders Association

Acknowledgments

The Worcester County Site Planning Roundtable would not have been possible without the time and effort extended by the roundtable members, the resources provided by the County and the generous support of the National Estuary Program (NEP) and the Maryland Coastal Bays Program. We would also like to thank the individuals who served as subcommittee chairs:

Erik Windrow: Residential Streets and Parking Lots

Sandy Coyman: Lot Development and Conservation of Natural Areas

In addition, we would like to extend a special thanks to Dave Blazer, Executive Director of MD Coastal Bays Program for his work throughout this process and Phyllis Wimbrow, Worcester County, Development Review and Permitting who spent time on the Codes and Ordinances Worksheet (COW). We also want to thank Worcester County for use of its facilities. Team members included George Chmael and Jay Sherman of Ecologix Group, Inc, and Anne Kitchell, Paul Sturm and Stephanie Sprinkle from the Center for Watershed Protection.

Copies of this document are available from MD Coastal Bays Program at www.mdcoastalbays.org, Worcester County, or the Center for Watershed Protection, www.cwp.org .

Cover Photo Credit: Manklin Creek, Andy Serrell

Table of Contents

Executive Summary	5
Purpose	6
Introduction and Background	6
Why Worcester County, MD?	7
The Worcester County Roundtable Process	8
Membership Statement of Support	9
Recommended Model Development Principles	10
<i>Streets and Parking Lots Principles</i>	10
Principle #1 Street Width	10
Principle #2 Street Length	11
Principle #3 Right-of-Way	11
Principle #4 Cul-de-Sac	11
Principle #5 Vegetated Open Channels	12
Principle #6 Parking Ratio	14
Principle #7 Mass Transportation	14
Principle #8 Parking Lots	15
Principle #9 Structured and Shared Parking Lots	15
Principle #10 Parking Lot Runoff	15
<i>Lot Design Principles</i>	16
Principle #11 Open Space Design	16
Principle #12 Setbacks and Frontages	16
Principle #13 Sidewalks	17
Principle #14 Driveways	17
Principle #15 Open Space Management	17
Principle #16 Rooftop Runoff	18
<i>Natural Area Principles</i>	18
Principle #17 Buffer Systems	18
Principle #18 Buffer Maintenance	18
Principle #19 Clearing and Grading	19
Principle #20 Tree Conservation	19
Principle #21 Conservation Incentives	19
Principle #22 Stormwater Outfalls	20
Principle #23 Septic Systems	20
<i>Overarching Principles</i>	20
Principle #24 Coastal Bays Watershed Stewardship Education and Certification Program for the Development Community	20
Principle #25 Coastal Bay Landowner/ Manager Education and Stewardship Program	21
About the Worcester County Local Site Planning Roundtable Partners	22
References	23

Executive Summary

This document is a product of the Worcester County Local Site Planning Roundtable, a nine-month long consensus process initiated by the *Maryland Coastal Bays Program* to review existing development codes and identify regulatory barriers to environmentally-sensitive residential and commercial development at the site level. A diverse cross-section of local government, civic, non-profit, environmental, homebuilding, development and other community professionals made up the membership of the Worcester County Roundtable. Through a consensus process, members of the Roundtable provided the technical expertise needed to adapt the National Model Development Principles to specific local conditions. Roundtable membership recommendations include general and specific code and ordinance revisions that would increase flexibility for site design standards and promote the use of open space and flexible design development in Worcester County.



The National Model Development Principles refined by the Worcester County Local Site Planning Roundtable are designed to collectively meet the objectives of Better Site Design (BSD), which are to: (1) reduce overall site impervious cover, (2) preserve and enhance existing natural areas, (3) integrate stormwater management, and (4) retain a marketable product. Code modifications and other targeted recommendations of the Roundtable were crafted to remove regulatory hurdles and provide incentives, flexibility, and guidance for developers in implementing BSD. This process is focused on model development principles at the site level and does not include discussions on zoning or land use.

Highlights of the Worcester County Local Site Planning Roundtable Membership Recommendations	
Design of Residential Streets and Parking Lots	
<ul style="list-style-type: none"> • Reduce minimum required street pavement width to 18 ft. for rural residential roads under 400 average daily trips (ADT) and to 20 ft. for urban streets and rural residential roads over 400 ADT • Reduce the right-of-way to 30 ft. for closed section residential roads and set ROW for open section roads to be up to 45 ft. • Establish a series of model turnarounds to encourage use of alternatives to cul-de-sacs • Provide design standards and encourage use of vegetated open channels • Reduce minimum parking requirements for several land use areas and have excess parking be provided in pervious materials • Provide mass transit bus stops and sidewalks in large commercial areas and shopping centers • Allow shared parking agreements • Encourage stormwater practices to be located in mandatory tree islands and other landscaped areas 	
Lot Design	
<ul style="list-style-type: none"> • Increase density in R-3, R-4 and R-5 residential zones if higher environmental standards are provided • Reduce front yard setback to 15 ft. in R-2 through R-5 zones • Set sidewalk width requirements to 3 ft. for developments of 6 dwelling units or greater • Create a shared driveway model agreement and encourage use of both alternative pavers and shared driveways • Support open space management guidelines through the comprehensive plan • Dedicate HOA funds for open space management • Incorporate subdivision lot runoff into the overall subdivision stormwater management plan 	
Natural Areas Protection	
<ul style="list-style-type: none"> • Expand the non-tidal stream buffers beyond the current 25 ft. requirement • Require an on-site pre-construction meeting • Require phased clearing and grading of large tracts of land • Increase administrative penalties for exceeding approved clearing and grading areas • Develop code to protect large continuous forest tracts • Increase funding to expand inspection and enforcement of existing stormwater regulations • Expand septic system policies and efforts County wide 	
Overarching	
<ul style="list-style-type: none"> • Create a program to provide educational opportunities and incentives to developers to use better site design techniques • Create a program to educate landowners/managers on the benefits and responsibilities of living in a coastal community 	

Purpose

This document presents specific recommendations on how to foster more environmentally-sensitive local site design in Worcester County. The recommendations were crafted in conjunction with a diverse cross-section of development, local government, civic, non-profit, environmental, and other community professionals that participated in the Worcester County Site Planning Roundtable initiated by the Maryland Coastal Bays Program.

Introduction and Background

Every year, over two million acres of land are altered as a part of the development process. Development has historically led to a 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). The development radius around many of our cities and smaller municipalities continues to widen at a rapid rate, far outpacing the rise in population (Leinberger, 1995). Coastal communities, like Worcester County, tend to be the recipients of the majority of the population nationwide (NOAA, 1990). As a result, local codes and ordinances that promote a reduced impact of development on local water resources are critical to future sustainability.

The protection of water resources and the character of the landscape under a continued growth scenario requires local governments, developers, and site designers to fundamentally change the way that land is developed. Deciding where to allow or encourage development, promote redevelopment, and protect natural resources are difficult issues that jurisdictions have to balance. While effective zoning and comprehensive planning are critical, communities should also 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 Maryland Coastal Bays and EcoLogix convened a local site planning roundtable in Worcester County, MD. The local roundtable process in Worcester was modeled after the National Site Planning Roundtable, the 22 Model Development Principles and four basic objectives:

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

The 22 Model Development Principles act as benchmarks upon which more specific code and ordinance recommendations were adapted for Worcester County. The benefits of applying these 22 Model Development Principles are summarized in the table below.

Benefits of Applying the Model Development Principles	
<p>Local Government:</p> <ul style="list-style-type: none"> • Increases local property tax revenues • Facilitates compliance with wetlands and other regulations • Assists with stormwater regulation compliance <p>Homeowners:</p> <ul style="list-style-type: none"> • 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 	<p>Developers:</p> <ul style="list-style-type: none"> • Allows flexibility in design options • Reduces development costs • Allows for more sensible locations for stormwater facilities • Facilitates compliance with wetlands and other regulations <p>Environment:</p> <ul style="list-style-type: none"> • Protects sensitive forests, wetlands, and habitats from clearing • Preserves urban wildlife habitat • Protects the quality of local streams, lakes, and estuaries • Generates smaller loads of stormwater pollutants • Helps reduce soil erosion during construction

Why Worcester County?

While other communities in Maryland have implemented a local site planning roundtable, Worcester County is the first eastern shore community to embark on this process. The purpose of the project is to adapt the principles developed at the national level for local application and identify local codes and ordinances that act to prohibit or impede better site design through a consensus-building process.

Worcester County is a unique case study because of its protection of agricultural land and its existing innovative subdivision regulations. It is one of the few communities that have successfully protected agricultural and conservation land while directing the majority of growth into targeted areas (Figure 1). In its Agricultural (A-1) zoning district, subdivision is very limited and large farms are fairly well protected. Extensive A-1 zoning limits sprawl in the County. In addition, Worcester County has already implemented changes to its codes and ordinances to promote environmentally sensitive design and had one of the highest initial scores on the codes and ordinance worksheet of any community surveyed.

Worcester County was selected as a location for a roundtable for several reasons:

- From 1990-2000, Worcester County grew at the second fastest rate in Maryland. Trends suggest that Worcester County population will rise rapidly and likely double in size east of Route 113 by the year 2020.
- Ten million people visit Worcester County every year, which contributes substantially to the level of human impact on its natural resources.
- The County government expressed an interest and was willing to commit staff to the process.
- There was support among the local building community including the Eastern Shore Builders Association.
- The County has adopted the new Maryland stormwater regulations that provide a credit system linked with better site design techniques.
- This project will provide an opportunity for Maryland Coastal Bays Program to enhance and contribute to establishing innovative and transferable technologies to other coastal areas with similar development issues.

With the objective of promoting environmentally superior building practices for new development in the Maryland coastal bay region, Maryland Coastal Bays Program, Worcester County, EcoLogix, the Center for Watershed Protection, and members of the building community forged a coalition to implement a Local Site Planning Roundtable in Worcester County.

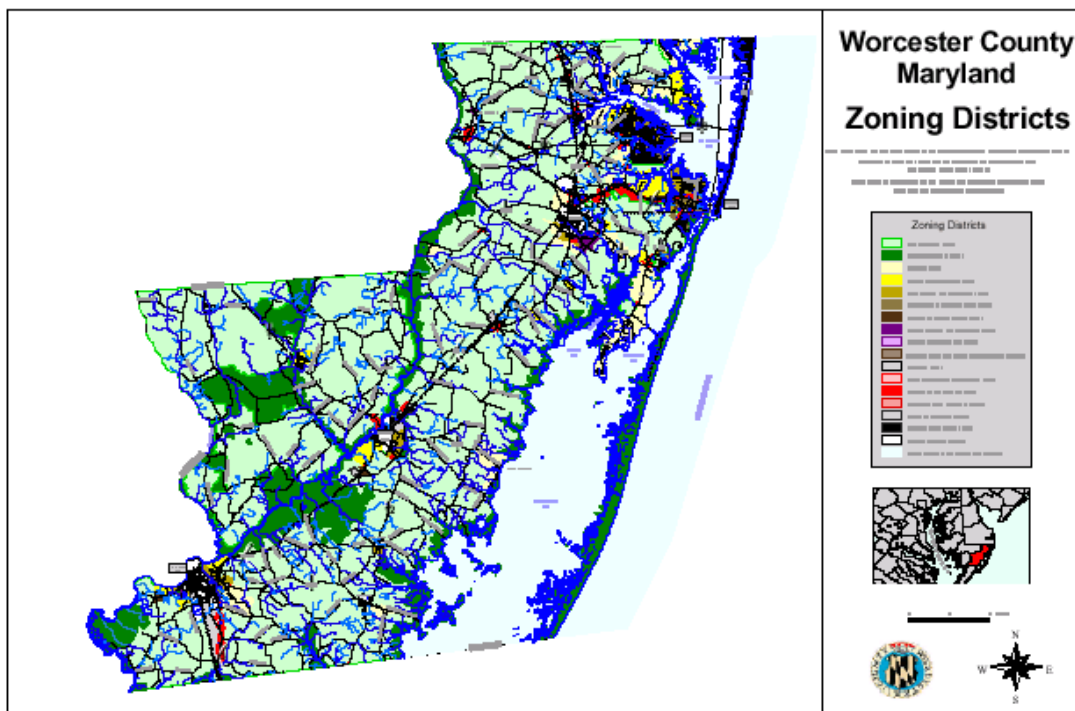


Figure 1: Worcester County Zoning Map
 (A-1 zoning shown as light green and protected resource land is shown in dark green)
 Source: Worcester County Department of Comprehensive Planning, 2004

The Worcester County Roundtable Process

Worcester County Roundtable members convened many times over an eight-month period to become familiar with the BSD principles, review existing codes and regulations, work in subcommittees, and reach group consensus on a final set of recommendations. The Roundtable consisted of over 20 dedicated members representing a wide range of professional backgrounds and experience related to local development issues. The process included the following steps:

1. **Kickoff meeting, November 2003.** The Maryland Coastal Bays Local Site Planning Roundtable kick-off meeting in November 2003 introduced stakeholders to the National Model Development Principles, reviewed the Codes and Ordinance Worksheet (COW) for Worcester County, and had participants apply Better Site Design concepts through a hands-on subdivision site plan redesign exercise.
2. **Detailed codes analysis, December 2003.** The codes analysis was based on results from the COW, feedback from the November kickoff meeting, and excerpts from existing codes and ordinances. This analysis completed by the Roundtable facilitators provided a concise summary of the regulatory barriers to implementing environmentally-sensitive site design in Worcester County and served as the foundation for subcommittee discussions.

The primary documents used for this analysis and for reference during the roundtable are listed below:

- 2002 Worcester County, MD Code of Public Local Laws (County Code) with County Code Supplement No. 9 & on-line version at <http://www.co.worcester.md.us/>.
 - Worcester County Zoning and Subdivision Control Article: Proposed Residential Planned Communities (RPC) Road Standards
 - Worcester County Road Construction and Design Standards 1995 Resolution (County Road Standards).
3. **Subcommittee meetings and consensus building, January - May, 2004.** The full Roundtable split up into two subcommittees with the diversity of interests and expertise represented in each. Each subcommittee was responsible for coming to consensus on a subset of the Model Development Principles.
 - Residential Streets and Parking Lots
 - Lot Development and Natural Areas

Both groups met in January and March, 2004. Lots Development and Natural Areas Subcommittee met one additional time in April.

4. **Consensus on final recommendations, June 2004.** The full Roundtable came to consensus on the full suite of recommendations.



Membership Statement of Support

This document of recommended development principles was crafted in conjunction with the diverse cross-section of development, local government, civic, non-profit, environmental, and other community professionals that participated in the Maryland Coastal Bays Program Worcester County Site Planning Roundtable. Members of the Roundtable provided the technical experience needed to design and refine the model development principles for Worcester County.

While these recommendations reflect our professional and personal experience with land development, they 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.

All members of the Worcester County Site Planning Roundtable endorse the model development principles presented here.

Diane Baudrau
Worcester County Department of Development Review and Permitting

Dave Blazer
Maryland Coastal Bays

Todd Burbage
Blue Water Development, Inc.

Carol Cain
Maryland Coastal Bays

Jay Charland
Assateague Coastal Trust

Joel Covington
Taylor Bank

Sandy Coyman
Worcester County Department of Comprehensive Planning

Colleen Deptula
Beach Construction, Eastern Shore Builders Association

Kelly Lynn Henry
Worcester County Department of Development Review and Permitting

Sandy Hillyer
Metropolitan Strategies

Keith Lackie
Worcester County Department of Development Review and Permitting

Merrill Lockfaw
Worcester County Roads Department

Matt Mathias
Becker Morgan Group

Ed Tudor
Worcester County Department of Development Review and Permitting

Stacey Weisner
Worcester County Department of Development Review and Permitting

Phyllis Wimbrow
Worcester County Department of Development Review and Permitting

Erik Windrow
Prudential Carruthers Realtors

Recommended Model Development Principles by the Worcester County Site Planning Roundtable

The recommendations that follow are formatted to show the **model development principles in bold**, *rationale in italics*, the membership recommendation in plain text, and specific modifications to code language appear as ~~strikethroughs~~ or as underlines.

Residential Street and Parking Lot Principles

Principle #1 Street Width

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

Rationale: Residential streets are often unnecessarily wide and the excessive widths contribute to making them the largest single component of impervious cover in a subdivision. The US Fire Administration recommends an 18-20' wide street to accommodate a fire vehicle. Worcester County already has an innovative set of road standards especially in their residential planned communities (RPC) zone and the county does not require on-street parking, which allows for further reduction of road width.

The Roundtable members endorse this principle with the following recommendation: Change the rural and urban road widths to allow them to more closely mimic the RPC standards. Recommended changes are shown in Table 1.

Table 1: Current and Recommended Residential Road Widths and Right-of-Way of Worcester County						
Residential Street	Max ADT	# Lots	Minimum Design Width (feet)			
			Paved	Shoulder	ROW	ROW open section
Minor Subdivision	-	<5	18'	2'	<u>40' 30'</u>	<u>Up to 45'</u>
Minor Road	-	<10	16'	6'	<u>50' 30'</u>	<u>Up to 45'</u>
Rural Road	Up to 250	-	<u>22' 18'</u>	3'	<u>50' 30'</u>	<u>Up to 45'</u>
	251-400	-	<u>22' 18'</u>	3'	<u>50' 30'</u>	<u>Up to 45'</u>
	401-750	-	<u>24' 20'</u>	4'	<u>50' 30'</u>	<u>Up to 45'</u>
Urban Street	<750	-	<u>24' 20'</u>	-	<u>50' 30'</u>	<u>Up to 45'</u>
Proposed RPC Suburban	Up to 400	-	18'	3'	30'	<u>Up to 45'</u>
	401-1500	-	20'	3'	30'	<u>Up to 45'</u>
Proposed RPC Urban/Suburban	A	-	21'	3'	30'	<u>Up to 45'</u>
	B	-	19'	3'	30'	<u>Up to 45'</u>
	C	-	15'	3'	30'	<u>Up to 45'</u>
	D	-	15'	3'	30'	<u>Up to 45'</u>
Road Type: A& B -Two way, unimproved, one side parking; C – Two way, no parking graded and drained; D – One way, one side parking, soil surfaced						

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.

Rationale: The 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 desired dwelling units. Worcester County has a provision “no minimum lot size” in their RPC floating zone that can be applied to zones E-1, and R1-R5 to help to minimize street length and impervious coverage (Table 2).

The Roundtable members endorse this principle with the following recommendation: Clarify that impervious cover reduction is one of the intentions of the RPC zoning code by adding the following language to ZS-1-319:

The intention of having no minimum lot size within the RPC zoning category is to provide flexibility to allow a reduction in both street length and overall impervious cover.

Table 2: Lot Area Requirements for Worcester County Standard Zoning and RPC – Floating Zone							
Subdivision Type	Required Open Space	Dwelling Unit (du) per Acre and Lot Size					
		A-1	E-1	V-1	R-1	R-2	R-3/4/5
Standard Zoning	30%	NP	1 du/2 acres	NP	1du/1acre	4du/1 acres	6 du/1acre
RPC- Floating Zone ZS 1-319	30%	NP	No minimum lot size	NP	No minimum lot size		
*RPC floating zone overlays above zones and can include various types of developments with a few exceptions (County Code ZS 1-319) NP = not permitted							

Principle #3 Right-of-Way

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 or county right-of-way (ROW).

Rationale: A wide ROW is only needed when utilities and sidewalks are located some distance from the paved section of the roadway. ROW widths can be reduced when applying design techniques, such as reducing street width (Principle #1), reduced sidewalk requirements (Principle #13), and relaxing the border width, which separates the street from the sidewalk. The current County regulations only allow for reduction of ROW width in RPC areas and the membership supports expanding that flexibility to non-RPC areas. Ultimately, this should help reduce driveway length, the house setback and the area graded for house construction.

The Roundtable members endorse this principle with the following recommendation: In all zoning categories the ROW shall be 30ft for closed section roads and variable up to 45 feet when open section drainage is used to allow space for gently sloped grass channel swales as recommended in Principle #5. Recommended changes are shown in Table 1 under Principle #1.

Principle #4 Cul-de-Sac

Minimize the number of residential 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 that reduce impervious cover including looped-lanes, tear drops, island cul-de-sacs, and hammerheads are promoted.

Rationale: Reducing the impervious cover associated with conventional cul-de-sac turnarounds can be accomplished by reducing the minimum paved turning radii, by redesigning the turnaround with a landscape island or alternative shape, or by reducing the total number of turnarounds by modifying street layouts. The current regulations provide for reasonable minimum turning radii as shown in Table 3.

Table 3: Current Worcester County Minimum Cul-de-Sac Radii Requirements	
Location	Min. Turning Radius (ft.)
Minor Roads – totally paved	30
RPC Residential – paved	35
RPC Residential – with landscaped island	22

The Roundtable members endorse this principle with the following recommendations:

a) Create a series of model turnarounds that are based on emergency vehicle access needs and snow removal. Two types of turnarounds that the County currently does not have models for include Teardrops and Hammerheads (Figures 2 and 3).

b) Add the following language to County Code ZS 2-502

(6) Cu-de-sac.

B. Dead-end streets. Every dead-end street shall terminate in a cul-de-sac, looped lane; tear drop, island cul-de-sac, or hammerhead.

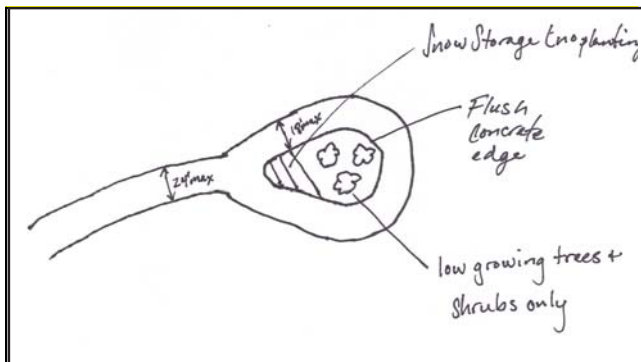


Figure 2: Teardrop turnaround

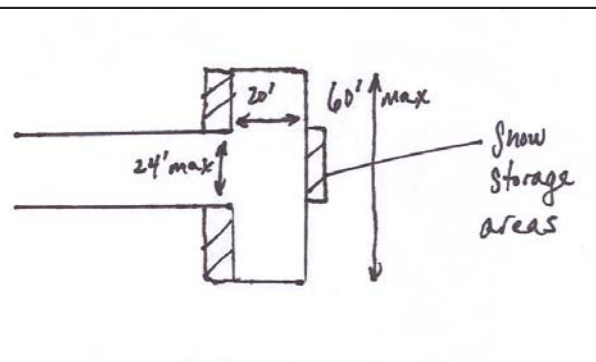


Figure 3: Hammerhead turnaround

Principle #5: Vegetated Open Channels

Vegetated open channels should be used in the street right-of-way to convey stormwater runoff, where density, lack of utility conflicts, topography, soils, and slope permit.

Rationale: Streets contribute higher loads of pollutants to urban stormwater than any other source area in residential developments (Bannerman, *et al.*, 1993 and Steuer, *et al.* 1997). The use of vegetated open channels in the street right-of-way to convey stormwater runoff can remove some of these pollutants and decrease the volume of stormwater generated from a site. The County currently permits vegetated open channels in RPC zones, minor subdivisions, and rural roads.



The Roundtable members endorse this principle with the following recommendations:

- a) Create a gentler slope swale standard for open section roads and include it in appropriate regulation locations in order to make homeowner swale maintenance easier, reduce county maintenance and enhance stormwater treatment (Figure 4 and 5).
- b) Encourage open section drainage when feasible. Remove the stipulation in Zoning Subdivision code ZS-2-502 that requires curb and gutter on lots with widths of less than 100 ft.
- c) Create a ditch and swale maintenance education program as part of the recommended “Landowner/Manager Education and Stewardship Program” (Principle #25).

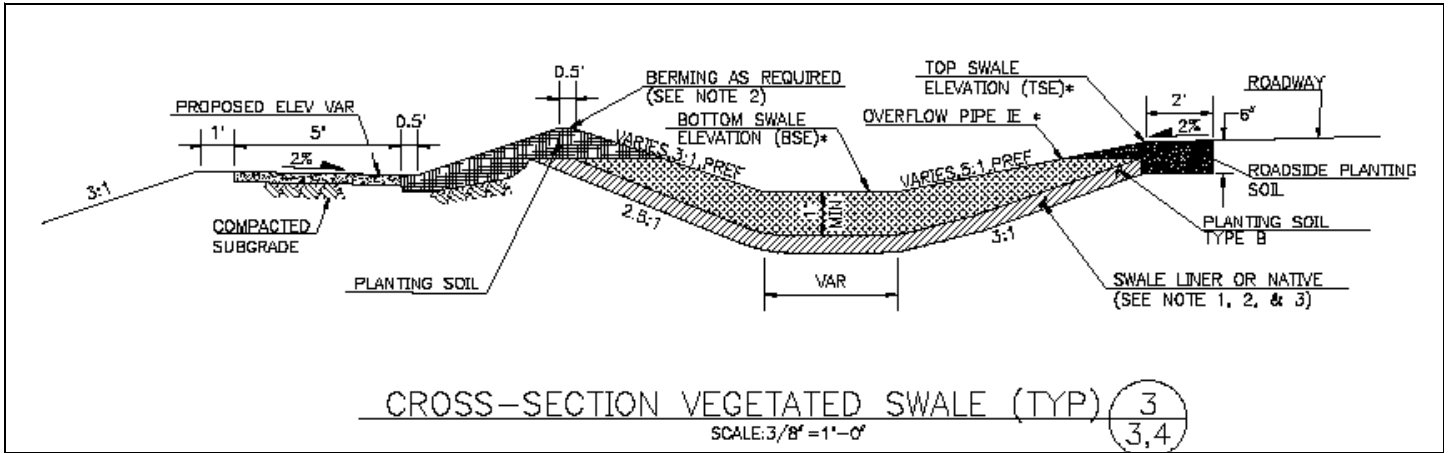


Figure 4: SEA Streets Project (SPU, 2004)

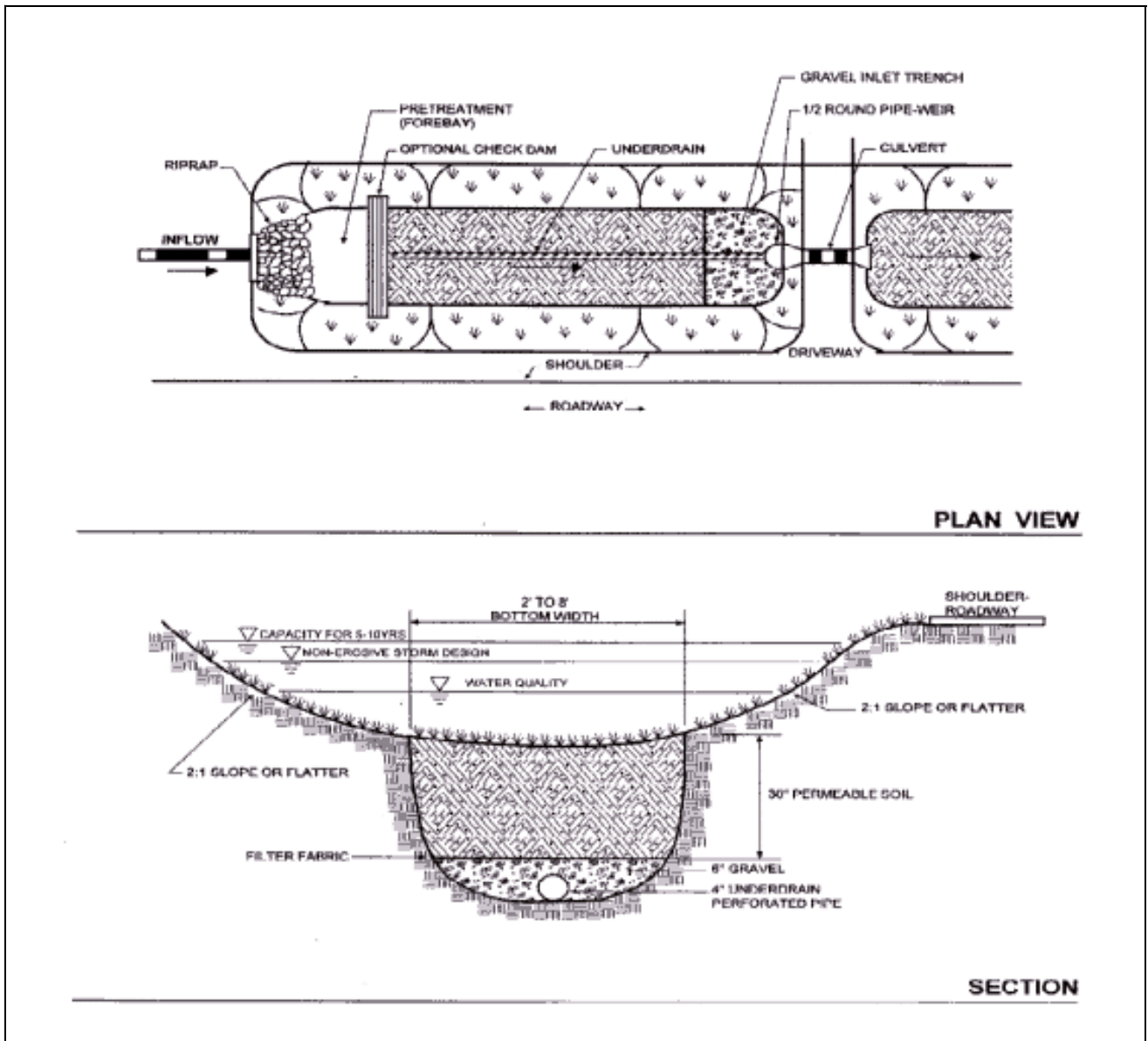


Figure 5: Dry Swale Schematic (CWP)

Principle #6: Parking Ratio

The required parking ratio governing a particular land use shall be based on ITE (Institute for Traffic Engineers), ULI (Urban Land Institute) standards or based on local parking lot usage data if available. Additional spaces beyond the County minimum (ULI/ITE median) shall be provided in pervious form to reduce stormwater and promote infiltration.

Rationale: A parking ratio typically expresses the minimum number of parking spaces that must be provided for a particular land use. In many cases, these parking ratios result in far more spaces than are actually required. The minimum parking requirements generally fell within typical ranges seen elsewhere in the country. The Roundtable membership supports reducing potential excess parking, and thus impervious surfaces.

The Roundtable members endorse this principle with the follow recommendation: Change County Parking Code ZS 1-308 to reduce the minimum required spaces as shown in Table 4.

Table 4. Comparative Parking Ratios for Worcester County and Typical Requirements and Parking Demands*				
Land use	Minimum Parking Requirements			Typical Actual Average Parking Demand**
	Units	Worcester County	Typical Range**	
Single Family Homes	Per 1 dwelling unit	2	1.5 – 2.5	1.11
Shopping Center	Spaces per 1000ft. ² GFA (Gross Floor Area)	6.7 4.5***	4.0 – 6.5	3.97
Convenience Store		11.6± 8***	2.0 – 10.0	--
Industrial		0.5***	0.5 – 2.0	1.48
Medical/Dental Office		5***	4.5 – 10.0	4.11
Professional Office Building		5 3***	--	3
*Based on retail store requirements **CWP, 1998 *** Any parking above the minimum parking ratios shall be provided in pervious parking. Worcester County Codes of Public Law ZS 1-308, Worcester COW, and from CWP (1998).				

Principle #7: Mass Transportation

Mass transit bus stops shall be provided for large shopping centers and commercial stores to promote the use of transit and reduce the demand for parking. Sidewalks or paths shall be provided within commercial areas to promote safe movement of pedestrians.

Rationale: Recognizing that mass transportation in the future will play an ever increasing role in Worcester County, providing bus stops and sidewalks at shopping centers and commercial areas should help increase the use of mass transit and improve support to segments of the population that do not have motor vehicles.

The Roundtable members endorse this principle with the follow recommendation: Provide mass transit stops and sidewalks in commercial areas and shopping centers with over 30,000 ft.² of store area.

Principle #8: Parking Lots

Reduce the overall imperviousness of parking lots by allowing a reduction in stall size where there are parking islands to accommodate vehicle overhang, incorporating efficient travel lanes and using pervious materials in parking lots sized greater than the minimum.

Rationale: The size of a parking lot is driven by stall geometry, lot layout, and parking ratios. The County codes permit reduction in stall size with special approval when an overhang is provided into a landscaped island. Reductions in stall sizes associated with Park and Ride facilities and Planned Commercial Developments are permitted by-right (Table 5).

The Roundtable members endorse this principle with the following recommendation: Permit by-right reduction in stall size when overhang is provided into a landscaped island in order to further encourage stall size reduction.

Table 5: Current and Recommended Minimum Parking Stall Dimension Requirements in Worcester County			
Type of Stall	Width (ft.)	Length (ft.)	Requirement
Standard Space	10'	20'	By-right
Standard Space w/ 2' overhang into landscaping strip	10'	18'	Waiver required By-right
Park and Ride Facilities and Planned Commercial Developments			By-right
Not less than 60%	10'	18'	
Not less than 40%	9'	18'	
County Code ZS 1-308 (7)(b)			

Principle #9: Structured and Shared Parking

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

Rationale: Structured and shared parking arrangements can potentially reduce the impervious cover generated from surface parking. Incentives can be used to encourage these measures despite potential increases in construction costs. The County does not prohibit shared parking arrangements but has been reluctant to use them due to potential parking conflicts that may result with turnover of the businesses engaged in the agreements.

The Roundtable members endorse this principle with the following recommendation: Allow shared parking agreements that set aside room for additional spaces in case of future land use change.

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.

Rationale: Parking lots generate high volumes of stormwater runoff, and high levels of runoff contamination from pollutants deposited on the lot surface. These practices can make required greenspace/ islands more functional by providing areas for stormwater treatment. Reduction of parking lot stormwater runoff is listed as one of the many purposes of the landscaping and buffering regulations in Worcester County code. The Roundtable Membership supports further encouraging better stormwater management in parking lots.

The Roundtable members endorse this principle with the following recommendations:

- a) Encourage stormwater management within parking lots in all the appropriate County documents, such as stormwater manual, landscape manual, code language, etc.
- b) Encourage stormwater practices to be located in the mandatory tree islands and other landscaped areas.

Lot Design Principles

Principle # 11: Open Space Design

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

***Rationale:** Open space/cluster development is a compact form of development that concentrates density on one portion of the site in exchange for more open space elsewhere. The County's open space requirements range from 0%-50% depending on the subdivision type (Table 6). The Roundtable supports additional encouragement for preservation of high quality natural open space in Worcester County.*

The Roundtable members endorse this principle with the following recommendations:

- a) Increase density in R-3, R-4, and R-5 residential zones *if* higher percentages of open space and environmental standards are required. For example, the density changes and increased open space shown in Table 6 should be considered.
Note: To accommodate higher densities, associated issues must be addressed such as building height, and minimum lot sizes. Heights of four or five stories should be considered. Increased flexibility with minimum lot size requirements may need to be considered as well.

Table 6: Current and Recommended Density Changes for R-3, R-4, and R-5 Zones		
Zoning	Current density	Density for consideration with increased environmental standards*
R-3	6 du/acre	8 du/acre*
R-4		10 du/acre*
R-5		14 du/acre*
<p><i>* These increased densities should require a minimum of on-site open space of 50% (30% must be provided on-site and 20% may be provided off-site). However all off-site open space must be provided at a ratio 1.5 to 1. For example: A 100 acre site is developed and 30% (30 acres) is kept as open space on-site. The developer wishes to provide the additional open space acreage off-site (20 acres *1.5 = 30 acres of off-site open space).</i></p>		

- b) Permit some off-site open space mitigation within the same watershed through a specific management entity such as a land trust, etc. to ensure the higher standards are being met and maintained.
- c) Include the conservation subdivision approach to site design in the County's comprehensive plan.
- d) Provide for preservation of large contiguous parcels of forest in the comprehensive plan and codes and ordinances. For instance, for every 50 acres of contiguous forest preserved a developer may receive one extra lot.
- e) Include open space management in the "Coastal Bays Watershed Stewardship Education and Certification Program for the Development Community" (Principle #24).

Principle #12: Setbacks and Frontages

Relax side yard setbacks and allow narrower frontages to allow greater flexibility of design. Relax front setback requirements to minimize driveway lengths and reduce area of grading for house construction.

***Rationale:** Often subdivisions codes have very strict requirements that govern the geometry of the lot. By relaxing or reducing setbacks and using non-traditional designs imperviousness can be minimized by reducing driveway and roadway widths. Worcester County code requires only very minimal setbacks in R-1 cluster subdivisions and no setback requirements in the RPC zone. The Roundtable membership feels that the setback standards in conventional subdivisions are generally as low as possible except for the front setback in the R-2 through R-5 residential districts.*

***The Roundtable members endorse this principle with the following recommendation:** Reduce the front yard setback requirements in R-2 through R-5 residential districts from 35 ft. to 15 ft. from the property line or sidewalk, whichever is closest to the dwelling unit.*

Principle #13: Sidewalks

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

***Rationale:** Sidewalk requirements are an important element of many subdivision codes and are intended to protect pedestrians and address liability concerns. However, requirements should be flexible enough to meet pedestrian demand while minimizing the amount of impervious cover. The current County regulations set a maximum sidewalk width of five feet when required. The Roundtable membership supports setting the minimum and maximum width at the ADA minimal requirements of three feet for developments of six dwelling units or greater. If sidewalks are approved to be greater than three feet in width, they will be constructed of porous pavement.*

***The Roundtable members endorse this principle with the following recommendation:** Change the language in the Zoning and Subdivision Code ZS 2-502 as follows:*

(f) Sidewalks and/or bicycle paths other alternative transportation networks (i.e. walkways, trails through common green space, etc.) not more than five feet wide and/or curb and gutter may be required by the Planning Commission for all roads are not required in subdivisions unless there is six dwelling units per acre or greater. When required, sidewalks or other alternative transportation networks may not be more than three feet wide, and should be compliant with ADA regulations. If sidewalks are approved to be greater than three feet in width, they will be constructed of porous pavement. Waivers may be granted by the planning commission based on certain conditions, such as ADT, subdivision layout, or ROW.

Principle #14: Driveways

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

***Rationale:** As much as 20% or more of the impervious cover in typical residential subdivisions can consist of driveways (Schueler, 1995). Flexible local subdivision codes can allow developers the ability to reduce the amount of impervious cover created by driveways by permitting shared driveways, use of pervious material, narrow widths and minimal front setbacks. Shared driveways and alternative pavers are already permitted by the County.*

The Roundtable members endorse this principle with the following recommendations:

- a) Create a County shared driveway model agreement that is readily available to developers to help reduce legal concerns and remove a potential barrier to the use of this technique.
- b) Further encourage the use of alternative pavers and shared driveways in Worcester County through the “Coastal Bays Watershed Stewardship Education and Certification for the Development Community” (Principle 24).

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.

***Rationale:** Open space management is often poorly defined in most communities leaving the design and maintenance of the space up to the resident, homeowners’ association or other entities that may be ill equipped to properly maintain high quality open space. Worcester subdivision standards clearly place the responsibility of open space management under the homeowners association, however specific maintenance guidelines are not provided.*

The Roundtable members endorse this principle with the following recommendations:

- a) Support open space management guidelines in the comprehensive plan.
- b) Dedicate homeowner association funds for open space maintenance.
- c) Include open space management in the “Coastal Bays Landowner/ Manager Education and Stewardship Program” (Principle 25).

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.

***Rationale:** Sending rooftop runoff over a pervious surface before it reaches an impervious surface can decrease the annual runoff volume from residential development sites by as much as 50% (Pitt, 1987). While certain assumptions relative to residential lot runoff are made in review and approval of stormwater management practices, current County regulations do not require residential lot runoff to be considered in the overall stormwater management plan despite the fact that very often the lot runoff does flow into the developments stormwater management system. The Roundtable membership supports encouraging the proper treatment of residential lot runoff treatment and greater on-site filtration.*

The Roundtable members endorse this principle with the following recommendations:

- a) Require subdivision lot runoff to be incorporated into the overall subdivision stormwater management plan.
- b) Encourage new developments to take advantage of the Maryland Stormwater Design Manual stormwater credit system for roof top runoff disconnection by providing additional language in the code text that specifically list it as a preferred practice. Also include a list of other preferred non-structural on-site BMPs in the code and ordinances.
- c) Include rooftop runoff management in the “Coastal Bays Watershed Education and Certification Program for the Development Community” (Principle #24). The education elements should provide an overview of the elements/ conditions of when and how rooftop runoff should be directed to pervious areas and not routed to roadways or other impervious conveyance systems.
- d) Include rooftop runoff management in the “Coastal Bays Landowner/Manager Education and Stewardship Program” (Principle #25). The outreach should specifically target existing developments, new homeowners, multi-family units, commercial landowners, and county agencies and should encourage the use of use of planters, bioretention areas, rain gardens, etc.

Natural Area Principles

Principle #17: Buffer Systems

Maintain a naturally vegetated buffer system along all perennial streams that also encompasses critical environmental features such as the 100-year floodplain, steep slopes and non-tidal streams with the intention of improving water quality, preventing bank erosion, and providing wildlife habitat.

***Rationale:** Vegetated systems along shorelines, wetlands and streams can protect water quality, reduce flooding impacts, provide wildlife habitat, serve as a recreational resource and offer many economic benefits to the local community. Currently, the Critical Area Regulation in Worcester County regulates the protection of a portion of the headwater and non-tidal streams. The headwater and non-tidal streams outside of the Critical Area are also vital to maintaining acceptable water quality.*

***The Roundtable members endorse this principle with the following recommendation:** The County Commissioners should expand non-tidal steam buffers beyond current twenty-five foot requirement in order to provide greater protection for headwater and non-tidal streams that are not already protected by the Critical Area Regulation.*

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.

***Rationale:** In many communities that have stream buffer ordinances, the buffer is merely a line drawn on a map, which is virtually invisible to contractors and landowners. The key to effective preservation and management of local buffer program is a strong buffer ordinance that outlines the legal rights and responsibilities of the local entity that is responsible for the long-term management of the buffer. Buffer protection in Worcester County is provided in Forest Conservation Areas. The Roundtable membership supports expanding protection of all buffers during and after the construction of the development.*

The Roundtable members endorse this principle with the following recommendations:

- a) Physically delineate the natural areas buffer and community open spaces inside *and outside* of the forest conservation area during construction and mark with permanent signage after construction.
- b) Add language to homeowners' association covenant or landowner's property management guidelines to protect natural areas in perpetuity and specific requirements for natural area maintenance, including permanent signage of all buffers.
- c) Provide new homeowners at the time of purchase with written notification of their responsibilities and applicable regulations associated with the natural areas that are on or adjacent to their properties. Homeowners' associations should be responsible for dispersing this educational material.
- d) Set administrative penalties for encroaching into the natural area buffer areas at substantive levels to discourage future infractions.
- e) Include buffer education and protection should in the "Coastal Bays Watershed Education and Certification Program for the Development Community" (Principle #24) and "Coastal Bays Landowner/Manager Education and Stewardship Program" (Principle #25).

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.

Rationale: As much of a site should be conserved in a natural state as possible. Common tools to limit clearing are: erosion and sediment control ordinances, grading ordinances, forest conservation or tree protection ordinances, and open space development. Erosion and sediment regulations in Worcester County discourage excess clearing of natural vegetation "whenever possible" and require the limits of grading and clearing to be shown on the site plan. However, these measures are insufficient to prevent excessive clearing and grading during and after construction.

The Roundtable members endorse this principle with the following recommendations:

- a) Require an on-site pre-construction meeting to ensure that contractors are fully aware of buffer and tree save areas. The County, with developers input, needs to outline the specifics of this meeting including the specific mechanism for delineation, who would be required to attend, the agenda items, etc.
- b) Require phased clearing and grading to prevent unnecessary clearing of large tracts of land through the Codes of Public Laws. Phasing implementation should be based on realistically manageable acreage and the development plan.
- c) Set administrative penalties for exceeding the approved clearing and grading area at substantive levels to discourage future infractions. Developers and/or contractors should be held accountable for infractions.
- d) Include minimized clearing and grading and the promotion of site fingerprinting in the "Coastal Bays Watershed Education and Certification Program for the Development Community" (Principle #24).

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.

Rationale: Native trees, shrubs, and grasses are important contributors to habitat variability and quality of life. In addition, they can provide economic benefits to developers and homeowners. In particular, large stands of contiguous forest provide habitat for forest interior dwelling species (FIDS).

The Roundtable members endorse this principle with the following recommendations:

- a) The County Commissioners should develop code to protect large contiguous forest tracts.
- b) Include tree conservation practices in the "Coastal Bays Watershed Education and Certification Program for the Development Community" (see Principle #24) and the "Coastal Bays Landowner/Manager Education and Stewardship Program" (Principle #25).

Principle #21: Conservation Incentives

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

***Rationale:** Incentives and flexibility are effective ways to promote adoption of conservation and protection measures. Worcester County currently provides density compensation; stormwater credits and by-right open space development. The Roundtable membership supports providing additional conservation incentives.*

***The Roundtable members endorse this principle with the following recommendation:** Include the current conservation incentive opportunities in the education outreach material of the “Coastal Bays Watershed Education and Certification Program for the Development Community” (Principle #24).*

Principle #22: Stormwater Outfalls

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

***Rationale:** Stormwater management requirements can be used to control the quantity and/or the quality of stormwater runoff from new sites. The stormwater runoff quantity controls can minimize flooding, and sometimes reduce downstream erosion. Stormwater runoff quality measures can reduce the level of pollutants that enter the waterway and contaminate water sources. Worcester County already requires that all stormwater be treated prior to being discharged. Unfortunately there are insufficient staff resources to ensure compliance with this regulation.*

The Roundtable members endorse this principle with the follow recommendations:

- a) Provide the necessary County resources (i.e. staff, staff time, etc.) to increase inspection and enforcement of existing stormwater regulations to ensure compliance with the State regulations.
- b) Include components to increase understanding of regulations, preferred stormwater management options, and how existing facilities can be retrofitted to reduce stormwater runoff impact on natural resources in the “Coastal Bays Watershed Education and Certification Program for the Development Community” (Principle #24).

Principle #23: Septic Systems

The County should increase enforcement and education efforts for required maintenance, repair, and installation of septic systems.

***Rationale:** Failure of septic systems can result in surface or subsurface movement of nutrients and bacteria into the streams or other receiving waters. Nationally the accepted practice is to inspect the tank and leach field once every two years to make sure it is working properly, and to pump out the tank. Routine maintenance of septic systems by homeowners doesn't occur in the County. There are many programs already underway in the County to address septic system concerns, however they only apply to the Critical Areas.*

The Roundtable members endorse this principle with the follow recommendations:

- a) Expand septic system policies and efforts currently being implemented in Critical Areas County wide in order to protect the water table and other non-Critical Area water resources.
- b) Include septic system education in the “Coastal Bays Landowner/ Manager Education and Stewardship Program” (Principle #25).

Overarching Principles

Principle # 24: Coastal Bays Watershed Stewardship Education and Certification Program for the Development Community

A cooperative program between Worcester County local government, builders, environmental groups and Coastal Builders for the Bay should be developed to provide education opportunities and incentives to developers to use better site design techniques in order to protect the valuable natural resources of Worcester County.

Rationale: When regulations are already in place that allow for flexible site design, incentives can be an effective way to increase usage of conservation techniques. The County already has very progressive site planning regulations and further education and incentives could increase the use of environmentally sensitive site design.

The Roundtable members endorse this principle with the following recommendations: Create a “Coastal Bays Watershed Education and Certification Program for the Development Community” with the following elements:

- a) Include local government officials, developers, environmental groups, and Coastal Builders for the Bay in the committee to design and support this program.
- b) Target developers with an education campaign that includes the importance and benefits of better site design techniques, with an emphasis on the economic benefits. “How-to” resources should also be included.
- c) Create a certification process through which a constructed development can receive “Green Development” award/ recognition.
- d) Include a list of better site design elements and a predetermined certification point system in the education materials.
- e) Create two levels of recognition/ certification to recognize/ reward those developments that include better site design elements and those that go “above and beyond.”
- f) Consider participation incentives such as free marketing via newspapers and website, public recognition, referral system for developers, sign/flag to display at development site.
- g) Verify design elements at time of construction.

Principle #25: Coastal Bays Landowner/ Manager Education and Stewardship Program

An education program should be developed that will educate landowners/managers on the benefits of living in a Coastal Community and what their roles and responsibilities are in protecting the resources and character of the community.

Rationale: Landowners and managers can be major contributors to the improvement of environmental quality and often play a critical role in the acceptance and proper maintenance of stormwater management practices and habitat protection. Responsibility for natural resource protection must be taken by all community members, not just the development community.

The Roundtable members endorse this principle with the following recommendations: Develop a “Coastal Bays Landowner/Manager Education and Stewardship program” with the following elements:

- a) Include local government officials, developers, environmental groups, realtors, chamber of commerce, existing educational groups and Maryland Coastal Bays Program in the design and support of this program.
- b) Target the education and stewardship campaign to landowners/managers including homeowners, homeowners associations, commercial landowners, and professional property management companies.
- c) Develop a certification process for landowners/ managers that rewards use of Better Site Design techniques.
- d) Require new development and encourage existing homeowners’ covenant language to protect stream buffers in perpetuity and provide buffer maintenance requirements. Create adaptable template language that can be used by the homeowners associations and provide it to them through the program.
- e) Create adaptable buffer “notification” language that is provided to landowners/managers at the time of sale by homeowners associations that outlines the specific landowner’s responsibilities and applicable regulations associated with natural areas on or adjacent to their properties.
- f) Create/ adapt materials targeted to landowners/managers on:
 - Benefits and responsibilities of living in a Coastal community
 - Importance of proper maintenance requirements for stormwater management measures (ponds, vegetated channels, etc.)
 - Specific Coastal friendly behaviors (downspout disconnection, reduction/minimization of impervious surface, preventing buffer encroachment, reforestation, afforestation, etc.)
- g) New residents of the county should receive a “Welcome to Worcester County” package, which should include many of the above elements. The process to achieve this still needs to be determined- perhaps through the realtor industry or chamber of commerce.

About the Worcester Roundtable Partners

Maryland Coastal Bays Program



The Maryland Coastal Bays Program protects the land and waters of Assawoman, Isle of Wight, Sinepuxent, Newport, and Chincoteague bays.

Part of the National Estuary Program, the Maryland Coastal Bays Program is a partnership among the towns of Ocean City and Berlin, National Park Service, Worcester County, U.S. Environmental Protection Agency, and the Maryland Departments of Natural Resources, Agriculture, Environment, and Planning, which have come together to produce the first ever management plan for the coastal bays. The Maryland Coastal Bays Program is one of only 28 such programs nationwide.

Established in 1987 under the Clean Water Act, the National Estuary Program was developed to protect economically and environmentally sensitive estuaries across the United States by engaging all user groups.

For more information about Maryland Coastal Bays Program, visit www.mdcoastalbays.org

Center for Watershed Protection



Founded in 1992, the Center for Watershed Protection works with local, state, and deferral 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 also acts as a technical resource for local and state governments around the country to develop more effective urban stormwater and watershed protection programs.

The Center for Watershed Protection is a non-membership, nonprofit 501(c)3 corporation. Since its inception, the Center has provided technical assistance to local governments in thirty states and the District of Columbia. Oversight of the Center is provided by a Board of Directors and a national watershed advisory council, whose members are leaders in the watershed protection arena.

For more information on the Center for Watershed Protection, visit www.cwp.org.

EcoLogix Group, Inc.



EcoLogix Group, Inc. is a professional services company focused on providing clients with innovative solutions that fulfill economic goals while simultaneously creating environmental and social value for our communities. Working in multiple areas of influence including Energy Production, Ports & Maritime Operations, Manufacturing & Industrial, Coastal Zone and Brownfields Development, Fisheries and Natural Resource Management, Military Operations, and Education, we serve entities that impact our water, air and land.

For more information on the EcoLogix Group, visit www.ecologixgroup.com

References

- Bannerman, R., D. Owens, R. Dodds and N. Hornewer. 1993. "Sources of Pollutants in Wisconsin Stormwater." *Water Science and Technology*. 28(3-5): 241-259.
- Center for Watershed Protection (CWP). 2003. *Impacts of Impervious Cover on Aquatic Systems*. Ellicott City, MD.
- Center for Watershed Protection (CWP), 1998a. *Better Site Design: A Handbook for Changing Development Rules in Your Community*. Ellicott City, MD.
- Center for Watershed Protection (CWP), 1998b. *Consensus Agreement on Model Development Principles to Protect Our Streams, Lakes, and Wetlands*. Ellicott City, MD.
- Leinberger, C., 1995. "Metropolitan Development Trends of the Late 1990s: Social and Environmental Implications." *Land Use in America*, H.L. Diamond and P.F. Noonan, 1996, editors. Island Press. Washington, DC.
- NRCS, 2001. *Natural Resources Inventory*. United States Department of Agriculture. Natural Resources Conservation Service. January 2001.
- NOAA, 1990. *Population and Development in Coastal Areas*. On-line document:
<http://spo.nos.noaa.gov/projects/population/population.html>
- Pitt, R.E. 1987. *Small Storm Urban Flow And Particulate Washoff Contribution To Outfall Discharges*. UMI, Ann Arbor, MI, pp. 285-292.
- Schueler, T. 1995. *Environmental Land Planning Series: Site Planning for Urban Stream Protection*. Prepared by the Metropolitan Washington Council of Governments and the Center for Watershed Protection, Silver Spring, Maryland.
- Seattle Public Utilities (SPU), 2004. Street Edge Alternatives Project (SEA Streets. Seattle Public Utilities website.
http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/Street_Edge_Alternatives/index.asp
- Steuer, J., W. Selbig, N. Hornewer, and J. Prey. 1997. "Sources of Contamination in an Urban Basin in Marquette, Michigan and an Analysis of Concentrations, Loads, and Data Quality." U.S. Geological Survey, *Water-Resources Investigations Report 97-4242*.



Prepared by the
Center for Watershed Protection
8390 Main Street, 2nd Floor
Ellicott City, MD 21043
<http://www.cwp.org>